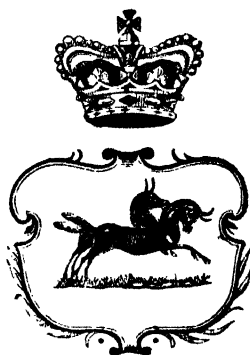




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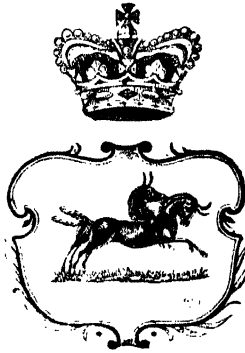
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CONTENTS.

	PAGE
ABATTOIR, NEW MARITZBURG : Facilities for the Slaughter of Cattle	429
AGRICULTURAL JOURNAL : Printing in Dutch	325
AGRICULTURAL ORGANISATION IN NATAL : Mealie Export	427
AGRICULTURAL SHOWS, DATES OF	453
ANGORA GOATS, EXPORT OF, FROM O.R.C.	329
ANIMAL DISEASES : The Position in March	443
ANTS, HOUSE : By Albert Kelly	331
BACON FACTORIES	384
COAL AND LABOUR RETURNS	447
CO-OPERATION, NOTES ON : By E. T. Mullens, Secretary, Minister of Agriculture	334
CORRESPONDENCE :	
Farm Telephones, Herbert G. Dempster, A.M.I.C.E. Canning Meaties, F. Harcourt. -When Did Lung sickness Come? M. Landsberg. - Fibre in London, Mackinlay & Co.	439
DEPARTMENTAL NOTICES :	
Brands Allotted to Infected Magisterial Divisions	453
Central Experiment Farm	451
East Coast Fever ; Slaughter Cattle ; Movement of Cattle in Yoke	454
DISTRICT REPORTS	438
EAST COAST FEVER REGULATIONS ; Claim for Damages	434
EAST COAST FEVER : Test of Mr. Turton's Alleged Cure	451
ENTOMOLOGIST'S OFFICE : Notes of the Month	388
"ERGATES" INTERVIEWS :	
Mr. Robert Topham, J.P.	338
Mr. Gilbert Wilkinson	355
ESTCOURT-WEENEN RAILWAY	325
EXHIBITION, S.A. ; Natal's Position	379
EXPERIMENT FARMS : Monthly Reports	423
FARMERS' ASSOCIATIONS, EXECUTIVES OF	459
FIBRE BROKERS IN LONDON	329
FIBRE CULTIVATION	326 & 371
FIBRE INDUSTRY, THE : By J. Medley Wood	323
FIBRE MACHINERY	325
FRUIT, EXPORT OF NATAL	399
GARDENING NOTES FOR MAY : By W. J. Bell	441
HAILSTORM INSURANCE	327
INSECT-CATCHING PLANTS	329
LOCUST PARASITES	328
LUNGSICKNESS AND SCAB : Return of Farms under Licence	418
MANGO, "JULIE"	327
MARKET REPORTS	449
MEALIE EXPORT	427
MEALIES, MOISTURE IN	326
METEOROLOGICAL RETURNS	446
NATAL AGRICULTURAL UNION : Annual Conference	396
NATAL ORCHARD ASSOCIATION : Suggestions to Senders of Fruit	381
NOTES AND COMMENTS	325
ORANGE, THE CULTIVATION OF THE : By Henry S. Dwyer	359
PINES IN LONDON, NATAL	325
POTATOES, MARKETING OF	325
POUND NOTICES	
SLAUGHTER OF CATTLE, FACILITIES FOR	
TENDERS FOR MEALIE MEAL	
TOBACCO INDUSTRY, ORGANISATION OF THE : Enterprising "Vreheid Farm"	
VETERINARY CONFERENCE, INTER-COLONIAL : Meeting	
WEIGHTS AND MEASURES, UNIFORM	
WOOD AND BARK : By F. C. Fernando	

Vol. X., No. 1.

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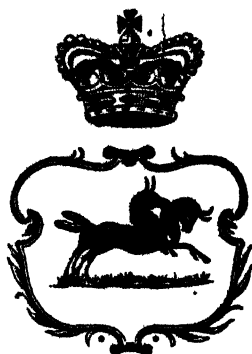
Department of Agriculture

CONTENTS.

	PAGE
ALABAMA : By F. A. Verney, F.R.C.V.S.	1
NOTES :	
Volume X ; E.C. Fever in Rhodesia ; The Weather ; South African Products Exhibition ; Bot-Flies ; Geometrical Progression ; O.R.C. Stock Regulations ; Old Country Life in England ; Annual Reports ; The cost of Coolie Labour ; Rosetta Co-operative Association ; Locusts for Fowls ; Hollow Building-Blocks ; Dry Farming	5
MATTHEW HARK AT RAVENSWORTH (illustrated)	10
EXPERIMENT STATIONS—PROGRAMME	11
RAPE CULTIVATION IN SOUTH AFRICA : By E. R. Sawyer, Director, E.S.	17
REPORT OF THE CONSERVATOR OF FORESTS ; SUMMARY	29
PRESENTATION TO CONSERVATOR OF FORESTS	30
RICHMOND AGRICULTURAL SOCIETY	31
EXPERIMENT FARMS	33
A. C. FEVER, EXPERIENCE OF RHODESIA	41
ELKOUR POULTRY	44
TITLE SHOW OF OLD	45
OPERATION ; Extract from Report of the Chamberlain Commission	47
FACTS OF GERMAN EAST AFRICA : By H. V. P. Berensberg	50
KEYS, THEIR CARE AND MANAGEMENT	53
DISTRICT REPORTS	59
ARDENING NOTES	62
ONE KRAAL MANURES	64
CORRESPONDENCE :	
Hellebore for Killing Ticks, W. H. Stafford ; Brazilian Linen, R. W. Bradstreet ; The Age of a Horse, W. A. Gilbert	65
A SCOTCH DAIRY FARMER	
VETERINARY REPORTS	
FRUIT CULTURE	
MANURES OF 1906	
MANURES ON THE NATAL MARKET	
METEOROLOGICAL RETURNS	
GOAL RETURNS	
ARMS UNDER LICENCE	
AT COAST FEVER	
HEAT REPORTS	
THE NOTICES	
UNION OF FARMERS' ASSOCIATIONS	
UNION OF FARMERS' ASSOCIATIONS	

CONTENTS.

	PAGE
BOWEL LESIONS IN THE HORSE DUE TO A STRONGYLUS	203
SHORT NOTES :	
Fourcroya Gigantea in Maritzburg ; Cheap Labour ; Lucerne ; Swing Ploughs ; The Rainfall ; Bags for Mealies ; Mr. J. Medley Wood, A.L.S. ; Ramie ; A Railway Matter	206
FIBRE CULTIVATION : By C. Rositzky	210
RAMIE	216
LIGHTNING	217
FIBRE : Interviews with Mr. N. C. T. Harper and Mr. C. Rositzky (Illustrated) : By Ergates	219
EXTREME TYPES	224
PASPALUM DILATATUM : Its Merits	227
PRESERVATION OF FRESH FRUIT	231
PROGRESS OF AGRICULTURAL ORGANISATION IN GREAT BRITAIN	232
HON. W. F. CLAYTON, M.L.A. : Late Minister of Agriculture (Illustrated)	235
TOMATO TROUBLES : By Albert Kelly (Illustrated)	236
CO-OPERATIVE BANKS FOR AGRICULTURE	245
AGE OF CATTLE AT SHOWS	251
"HORSESICKNESS" : By H. Watkins-Pitchford, F.R.C.V.S., F.R.S.E.	253
NATAL ORCHARD ASSOCIATION	262
CITRUS FRUIT EXPORT	264
EXPERIMENT FARMS	267
THE CAMPBELL SYSTEM OF CULTURE	277
SOME FACTS ABOUT TEA	281
OIL FROM MEALIES	283
MAIZE CULTIVATION IN SOUTH AFRICA : By E. R. Sawyer, Dir. E.S. (Illustrated)	284
CORRESPONDENCE :	
Hellebore for Killing Ticks, W. H. Stafford ; When did Lungsickness Come, J. Y. Gibson ; Hayacinths, etc., "Amateur"	290
GARDENING NOTES : By W. J. Bell	292
DISTRICT REPORTS	293
ALEXANDRA FIRRE CO., LTD.	294
IMMUNISATION OF MULES AGAINST HORSESICKNESS	295
VETERINARY DEPARTMENTAL REPORTS	296
IMMUNISATION OF MULES IN NATAL : by W. M. Power	307
IMPORTATION OF TROUT...	308
SACK-FILLING AND WEIGHING MACHINES	309
NATAL FRUIT IN LONDON	310
THE CULTIVATION OF CHILLIE PEPPERS	310
METEOROLOGICAL RETURNS	312
COAL AND LABOUR RETURNS	313
FARMS UNDER LICENCE	314
POUND NOTICES	315
MARKET REPORTS	315
AGRICULTURAL SHOWS	317
EXECUTIVES OF FARMERS' ASSOCIATIONS	3 8



. . . THE . . .
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CONTENTS.

	PAGE
TETANUS: By Jas. L. Webb, F.R.C.V.S. (Illustrated)	95
SHORT NOTES:	
USE OF ^{NEW} Agricultural Shows; East Coast Fever; Ramie Growing Association; Dry Farming; Bacon; Devons; Ensilage for the Dairy; Ox Harness ...	99
QUACKERY IN VETERINARY MEDICINES	102
S.A.P. EXHIBITION. LIST OF EXHIBITS: By T. R. Sim, F.L.S.	104
DO COWS REQUIRE SALT?	110
CO-OPERATION: By E. T. Mullens	111
AN OCTOGENARIAN FARMER. Interview with Mr. Wm. Taylor, Fordoun: By Ergates (Illustrated)	116
DEVONSHIRE CREAM AND SOFT CHEESE MAKING	121
NATAL BOTANIC GARDENS REPORT	125
HIGH FLATS FARMERS' CLUB	126
MAIZE CULTIVATION IN SOUTH AFRICA: By E. R. Sawyer, Dir. E.S. ...	127
HORSES AND TRANSPORT-RIDING. Interview with Colonel McKenzie, C.B.: By Ergates (Illustrated)	136
TICKS AND SULPHUR	141
"THE VICTORIES OF DRY FARMING" (Illustrated)	143
GARDENING NOTES FOR MARCH: By W. J. Bell	150
AN AGRICULTURAL CREDIT SYSTEM FOR THE CAPE COLONY	154
RANCH LIFE IN WYOMING	157
EXPERIMENT FARM REPORTS	159
CORRESPONDENCE:	
Clearing Land of Weeds, "Weeds"; Potato Seed, G. A. Stevens; Hellebore Remedy for Ticks, G. J. Archbell; Witchweed and Pineapples, D. Stapleton; Ox Harness, L.C.S.	164
INTERNATIONAL EXHIBITION AT BRUSSELS	165
EXPORT OF NATAL FRUIT	166
DISTRICT REPORTS	169
RAMIE; The Textile of the Future: By W. J. Bell	176
SAVAGE STALLIONS	180
VETERINARY DEPARTMENTAL REPORTS	183
ORNAMENTAL SEEDS	191
METEOROLOGICAL RETURNS	192
COAL AND LABOUR RETURNS	193
FARMS UNDER LICENCE	194
MARKET REPORTS	195
POUND NOTICES	196
AGRICULTURAL SHOWS	197
EXECUTIVES OF FARMERS' ASSOCIATIONS	198
DEPARTMENTAL NOTICES	200

Vol. X., No. 2.

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. . . THE . . .
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CONTENTS.

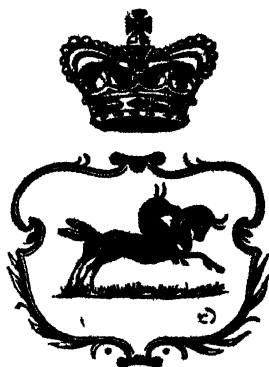
PAGE.

ABATTOIR, GOVERNMENT : Commencement of Operations...	551
AGRICULTURAL JOURNAL : Printing in Dutch ...	467
AGRICULTURAL ORGANISATION IN NATAL ...	523
AGRICULTURAL SHOW AT THE HAGUE INTERNATIONAL ...	465
AGRICULTURAL STATISTICS: The Need for their Collection By H. J. Choles F.S.S.	479
AGRICULTURE, SCHOOL OF ...	468
ALCOHOL, DE-NATURED ...	462
ANGORA GOATS, EXPORT OF, FROM O.R.C. ...	494
ANIMAL DISEASES : The Position in April ...	563
BLUE TONGUE IN SHEEP... ..	468
BRANDING OF CATTLE ...	471
CAPE AGRICULTURAL UNION ...	484
CENTRAL EXPERIMENT FARM : Visitors ...	463
CITRUS FRUIT CULTIVATION ...	464
COAL AND LABOUR RETURNS ...	567
CODLIN MOTH, CAPE FRUIT AND THE ...	461
C.O.D. SYSTEM : Attempt at Resuscitation ...	460, 557
COLD STORES, GOVERNMENT ...	462
CO-OPERATIE : Door E. T. Mullens, Secretaris, Landbouw Ministerie ...	489
CO-OPERATION AND EXPORT ...	463
CO-OPERATION, LECTURES ON ...	465
CO-OPERATORS, RAG-PICKERS AS ...	470
CORRESPONDENCE : Cowpeas, Theo. Menne ...	559
CORRESPONDENTS, HONORARY ...	464
COTTON AND SISAL : An Experiment in G. E. Africa ...	558
COTTON COMPETITION ...	532
CROPS, PROBABLE YIELD OF : 1906-7 ...	461, 530
CROWN LANDS DISPOSAL, REVISED REGULATIONS FOR ...	471
DEPARTMENTAL NOTICES :	
Bulletins issued by the Department ...	576
Central Experiment Farm, Cedara ...	571
Diamond Drilling ...	576
E.C.F. Brands Allotted to Infected Magisterial Divisions ...	575
E.C.F. : Slaughter Cattle ...	571
Employment Bureau ...	576
Trees for Sale ...	574
DISTRICT REPORTS ...	561
DONKEYS AS TRANSPORT ANIMALS ...	466
EAST COAST FEVER : Issue of Donkeys and Mules ...	553
EAST COAST FEVER RESTRICTIONS ...	548
ELECTRO-CULTURE ...	467

CONTENTS—continued.

PAGE

EMPLOYMENT BUREAU	463
ENTOMOLOGIST'S OFFICE: Notes of the Month	533
EXPERIMENT FARMS: Monthly Reports	538
FIBRE INDUSTRY, THE	461
FOURCROYA GIGANTEA	529
FOURCROYA IN NATAL	467
FRUIT, CAPE, AND THE CODLIN MOTH	461
FRUIT-GROWERS' ASSOCIATION, NATAL	472
FRUIT TREES AT WINTERTON	527
GARDENING NOTES FOR JUNE: By W. J. Bell	560
GROUND NUTS	499
HORSESICKNESS, MULES AND	466
HUTCHESON, DR., DEATH OF	537
INSECT-CATCHING PLANTS	470
INSECTS, CHATS ABOUT: By the Government Entomologist	500
LABORATORY REPORT	542
LAND BANK	488
LAND BANKS <i>versus</i> CREDIT BANKS: By E. T. Mullens, Secretary, Minister Agriculture	485
LIMESTONE	546
LITCHIS FOR EXPORT	462
LOCUST DESTRUCTION	550
LOCUST DESTRUCTION IN ARGENTINA	460
LOCUST DESTRUCTION, INTER-COLONIAL CONFERENCE ON	465
LOCUST OFFICER, CHIEF	484
LUNGSICKNESS AND SCAB: Return of Farms under Licence	568
MAIZE CULTIVATION IN SOUTH AFRICA: Storing, Handling and Marketing	473
MARKET REPORTS	569
MEALIES, REDUCTION OF FREIGHT ON	468
MEAT, COLONIAL FOR TROOPS	462
METEOROLOGICAL RETURNS	566
MULES AND HORSESICKNESS	466
NATAL AGRICULTURAL UNION: Annual Conference	505
NODULES, ROOT	547
NOTES AND COMMENTS	460
PINEAPPLES, CULTIVATION OF: By E. R. Sawyer, Director, Experiment Stations	495
PLANTS, ETC., EXPORT OF, CERTIFICATES FOR	556
POUND NOTICES	570
RAILWAY RATES ON GRAIN AND WATTLE BARK	552
RAMIE	466
SEEDS, QUALITY OF	545
SISAL IN G.E. AFRICA: Shade and Moisture Condition	529
SISAL HEMP, TODD MACHINE FOR	556
SUGAR INDUSTRY AGRICULTURAL BANK	549
TANNING MATERIAL	555
TEA LANDS, DETERIORATION OF	542
TEAS, NATAL, IN LONDON	469
TIMBER-FELLING IN NATAL CROWN FORESTS: By G. H. Davis	457
TOBACCO, DELAGOA TAX ON	484
TRANSPORT ANIMALS, DONKEYS AS	466
VETERINARY DEPARTMENTAL REPORTS, REGARDING	461
WATTLE BARK INSPECTION	469
WEED, A POISONOUS	565
WHEAT-PRODUCER, SOUTH AFRICA AS A	464



. . . THE . . .
NATAL
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JOURNAL
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CONTENTS.

	PAGE
AGRICULTURAL BILLS	581
AGRICULTURAL SCIENCE	585
AGRICULTURAL SHOWS	694
AGRICULTURE IN IRELAND, 1906	608
AGRICULTURE IN THE TRANSVAAL: A Year's Progress	618
ALCOHOL, DE-NATURED: By G. C. Williams	588
ALUM	676
ANIMAL DISEASES IN MAY	682
APHIS, WOOLLY; PARAFFIN EMULSION AND	641
ARGENTINA, EXPORT OF CATTLE FROM	582
BILLS, AGRICULTURAL	581
BLOCKS, ILLUSTRATED	580
CAMELS FOR TRANSPORT... ..	593
CARNIVORA, IMPORTATION OF	607
CATTLE DIPPING IN ARSENITE OF SODA	629
CATTLE FROM ARGENTINA, EXPORT OF	582
CHILLIES OR CAPSICUMS: Cultivation and Preparation for Market ..	623
COAL AND LABOUR RETURNS	689
CODLIN MOTH... ..	657
COFFEE-GROWING IN NATAL.—A Remedy for Leaf Disease: By E. R. Sawyer, Director, Experiment Stations	586
CORRESPONDENCE:	
Native Farm Labour, Reginaid A. Luck.—Citrus Cultivation, G. C. Williams.—House Ants, "Mooi River"	679
CYANIDE MANUFACTURE IN SOUTH AFRICA	580
DEPARTMENTAL NOTICES:	
Bulletins issued by the Department	699
Central Experiment Farm, Cedara	699
Co-operative Societies, Model Rules for	695
Diamond Drilling	693
E.C.F. Brands Allotted to Infected Magisterial Divisions	698
E.C.F.: Slaughter Cattle	695
Employment Bureau	700
Trees for Sale	694

CONTENTS—continued.

	PAGE
DIPPEN VAN BEESTEN IN ARSENIET VAN SODA	658
DIPPING, CATTLE, IN ARSENITE OF SODA	629
EAST COAST FEVER	666
ENTOMOLOGIST'S OFFICE: Notes of the Month	641
ESTIMATES OF CROPS	661
EXPERIMENT FARMS	668
EXPORT OF CATTLE FROM ARGENTINA	582
EXPORT OF PEARS AND APPLES	581
FARMERS' ASSOCIATIONS, EXECUTIVES OF	696
FLORA OF SOUTH AFRICA, THE:	
"The Forests and Forest Flora of the Colony of the Cape of Good Hope,"	
by T. R. Sim, F.L.S., F.R.H.S.—"Handbook to the Flora of Natal," by	
J. Medley Wood	638
GAME RESERVE, LOWER UMFOLOSI	685
GARDENING NOTES FOR JULY: By W. J. Bell	677
GRENADILLAS IN LONDON	665
INDIANS, INDENTURED	581
IRELAND, AGRICULTURE IN, 1906	608
JACKALS, DESTRUCTION OF	640
LABORATORY NOTES: By Alex. Pardy, F.C.S., Analyst	676
LOCUST DESTRUCTION, INTER-COLONIAL CONFERENCE ON	609
LOCUSTS IN MAY AND JUNE	643
LUCERNE, CULTIVATION OF: By E. R. Sawyer, Director, Experiment Stations	577
LUNGSICKNESS AND SCAB, Return of Farms under Licence for	690
MARKETS, SOUTH AFRICAN	686
MARTYNIA FRAGRANS	584
MEALIE EXPORT: Overseas Market.—Natal Mealie Crop.—Preparation for	
Export	662
METEOROLOGICAL RETURNS	692
NATIVES AND LAND	582
NOTES AND COMMENTS	580
PAARDEZIEKTE: Door H. Watkins Pitchford, F.R.C.V.S., F.R.S.E.	647
PARAFFIN EMULSION AND WOOLLY APHIS	641
PHOSPHATIC ROCKS	676
POUND NOTICES	693
RABIES: Importation of Carnivora	607
RATES ON SOUTH AFRICAN FIREWOOD, ETC., RAILWAY	592
RATES ON SOUTH AFRICAN GRAIN, REDUCED.	582
SCIENCE, AGRICULTURAL	585
SHOW SEASON, THE	660
SOUTH AFRICAN PRODUCTS EXHIBITION	580
SOUTH AFRICAN PRODUCTS EXHIBITION: A London View	636
SUGAR CANE CROP, WORLD'S	587
SUGAR CANE EXPERIMENTS IN THE WEST INDIES	627
SUGAR CONVENTION	691
SUGAR WORKS GUARANTEE ACT, QUEENSLAND	583
TOBACCO CULTIVATION IN SOUTH AFRICA, With Special Reference to Natal:	
By E. R. Sawyer, Director, Experiment Stations	631
TRANSCAAL, AGRICULTURE IN THE: A Year's Progress	618
VLEI SOILS: By Alex. Pardy, F.C.S.	605
WHEAT, "STANDARD FIFE"	585

Natal Agricultural Journal and Mining Record.

Equine Malaria.

By F. A. VERNEY, F.R.C.V.S.

EQUINE MALARIA is commonly known to stock-owners in South Africa as Biliary Fever. It is a type of disease known to pathologists as a piroplasmosis, and in this respect is closely allied to our ordinary Redwater, East Coast Fever, and Malignant Jaundice of the dog. Biliary Fever was first discovered in South Africa by Wiltshire in Natal and Hutcheon in the Cape (1883), and at this time the etiology of the disease was not understood. It is mainly due to the researches of Thielér that to-day we are acquainted with the pathology of this disease. Thielér found, on examining the blood taken from a case of Equine Malaria, certain animal parasites, which were enclosed in the red cells of the blood. These parasites varied very largely as to their frequency, and in some cases, unless one makes the examination at the onset of the disease, it is difficult to demonstrate the causal parasite in the circulating blood. On the other hand, in some acute cases, one may find as many as 10 per cent. of the red corpuscles infested with the parasite. The parasite is known as the piroplasma equi. It varies in shape. One meets pear, leaf, spherical and stave-like shaped parasites. By proper staining one can demonstrate a karyosome or nucleus which is always situated on the edge of a motile protoplasmic body. The parasite multiplies by fission or division, and as a result of this one sees corpuscles containing four parasites often disposed in a cruciform manner. This disposition illustrates one of the most characteristic features of the blood of equine Malaria, in contradistinction to the closely allied parasites of Redwater and canine Malignant Jaundice. Equine Malaria has a very wide distribution, and is practically found all over South Africa. In the Coast and Thorn belts the disease is very prevalent, and any susceptible equine

going into these areas during the summer months soon becomes infected. The disease is also found on the high veld of Natal, but the amount of infection varies very much according to their own conditions.

Most of the Mooi River veld is infected with Equine Malaria, and imported horses turned out on the veld usually sooner or later develop the disease. On the other hand the veld in the Polela district is very largely free from infection. Basutoland apparently has very little Equine Malaria, as Basuto-bred horses coming into Natal invariably sooner or later develop Equine Malaria, and sometimes in a very acute form. Before the Boer war horses coming into Natal from the O.R.C. frequently developed Equine Malaria, and it was largely owing to the effect of this disease that it was a common expression amongst colonists that a Free State horse was no good for hard work until he had resided twelve months in Natal.

All imported equines are susceptible, and there is nothing that made it so difficult for the Remount Department to keep up the supply of suitable horses during the war as the attack of the parasite of Equine Malaria.

Imported horses were often accused of being soft and chicken-hearted when it was the presence of the piroplasma in the blood that was invariably responsible for their incapacity for arduous work. Horses bred on infected veld usually possess an active immunity or tolerance, but this is not always the case, and one occasionally finds old horses developing Equine Malaria that have lived on infected veld all their lives. In this respect it simulates the behaviour of cattle to Redwater infection.

It is a very debatable point as to which imported horse is the most susceptible to the attack of Equine Malaria. Personally I am of the opinion the Argentine horse develops the disease in a more acute form than any other.

Symptoms.—The first symptom is a thermometric one, and if one takes the temperature of susceptible animals one would find a rise of temperature from 103 degs. F. to 107 degs. F. 24 or 48 hours before any other symptom is noticeable. This is an important point, and owners with valuable imported horses, running on the veld for stud purposes, should never delay taking the temperature if they have the least suspicion their horse is unwell. The animal becomes dull, appetite capricious, bowels become constipated, and the faeces develop into hard clay-like pellets, heavily coated with mucus, the pulse is very frequent, and may count from 80 to 100 per minute. The mucous membranes of the mouth and eyes are invariably in the horse of a distinct yellow colour, indicating considerable absorption of biliary products into the blood stream, and it is due to this constant symptom that the disease is called Biliary Fever. In the mule and donkey this bile staining is usually absent. The urine is high coloured, and in

bad cases it becomes brown or red, simulating the condition often seen in Bovine Redwater; the gait is frequently very unsteady, and in acute cases one has to be very careful in turning an animal, otherwise one may cause it to fall. As the disease progresses the animal becomes very depressed and debilitated, there is often swellings of the head, legs, chest, or sheath, indicating circulatory trouble, as the heart in this disease is always affected. Associated with this heart disturbance, one often observes difficult and laboured breathing, giving one the impression one has to deal with lung mischief.

The duration of the disease varies from five days to three weeks. Some animals, after showing evidence of recovery, get relapses. These are usually associated with heart trouble, and are always serious.

Imported mules and donkeys are very susceptible to Equine Malaria, and, instead of the jaundiced mucous membranes, these are of a very white or pale colour.

Post-mortem Changes.—On cutting into a dead horse one will at once notice the yellow colouring of all the tissues of the body. The spleen in acute cases is frequently (not always) very much enlarged, sometimes resembling an Anthrax spleen in size, but the consistency on section is not so diffuent; the heart shows ecchymoses or blood spots, both on the outside and inside; there may be an exudate into the covering of the heart (pericardium). In some cases the lungs may show evidence of congestion, but this is not usual. If the blood be noticed it is often watery in appearance. The piroplasma that is present in the cells of the blood has destroyed so many corpuscles that the quality of the blood has been so diminished that it can no longer carry out the functions nature requires of it. In a healthy horse the number of cells to a cubic millimetre is 7,000,000. In an acute attack of Equine Malaria this is often reduced in three days to 2,000,000. This fact is the direct or indirect cause of all the symptoms manifested in Equine Malaria. The liver is congested and deeply bile-stained, and the bile ducts often contain a thick brownish-yellow coloured fluid. The stomach and intestines are usually in a catarrhal condition, and blood spots may be present on the mucous membrane. The bladder is usually full, and contains brownish or dark-coloured urine. The kidneys are frequently enlarged and usually pale in colour, and the fat around them is often infiltrated with a serous fluid, and this is sometimes seen in the furrows of the heart.

The lymphatic glands of the viscera are often enlarged, juicy in section, and may contain blood spots or ecchymoses.

Treatment.—This consists of curative and preventative. If the curative treatment is taken in hand at this early stage of the disease then a large percentage of animals recover. In describing the symptoms I stated that the first evidence of the disease was indicated by means of the thermometer, and when Equine Malaria is expected,

owners should always take the temperature of any susceptible animal that is at all suspected of being unwell. I am frequently called to cases of this disease, and on my arrival I find the animal has been ill for several days. The owner had considered the animal not in its usual form, but as it continued to feed he did not consider there could be very much seriously wrong. The appetite in the early stages of the disease is a very unreliable guide to the disease, as when a horse ceases to feed suffering from Equine Malaria, then one can rely upon it the case is very far advanced. Horses suffering from this disease often feed up to 24 hours of death.

At the onset of the disease, half a pound of Epsom salts with two ounces of spirits ether nitrous should be given, and this should be followed night and morning with doses of quinine sulphate and spirits ether nitrous given in stout or kafir beer. The animal must be put under good conditions, loose box, plenty of fresh air. The body must be kept warm by means of rugs and bandages if the season of the year demands it. Hot enemias should be given night and morning, if condition of faeces indicate it. Gruel should be given instead of water, and the animal should be sparingly fed upon scalded bran, tops of good forage and green food. There are probably few acute equine diseases that respond better to good nursing than Equine Malaria. Complications, such as heart and lung trouble, must be anticipated in very bad cases, and these must be specially treated. Purgatives must always be avoided, as nothing kills quicker than a good sharp dose of physic. In treating the disease, it is essential to remember that it is not the liver that is the real trouble, but the anaemic condition of the blood, and if one can master this, then the condition of the liver will soon be rectified.

Animals after suffering from a bad attack are always much emaciated and very weak, and must be treated with good nourishing food, combined with suitable tonics.

Preventative Treatments.—Although there is no positive experiment to tell us that ticks cause Equine Malaria, all the clinical experience at hand goes to show that this is highly probable. In addition, we have the knowledge that all the other South African piroplasmoses are certainly tick-carried diseases. Argentine Thoroughbreds imported into Natal for racing purposes rarely develop Equine Malaria, but as soon as you turn these animals out to grass in the summer then they will certainly develop the disease. Properly kept racehorses rarely, if ever, become tick-infected. Experiment has not shown which of our five common ticks is responsible for the disease, but if I had to give an opinion then I should say it is either the Red or Blue tick, as I have seen bad outbreaks of the disease occur where the Brown Bontleg and Bont ticks did not exist. Outbreaks of the disease have been considerably reduced by systematic dipping.

Animals that are to be turned out on to the veld should, if pos-

sible, come on to the grass in the very early spring months, as then the animal is most likely to get a milder infection and recover than when turned out in midsummer, when a gross infection will most probably take place.

Theiler, in endeavouring to prove if the piroplasma of the horse, mule and donkey were the same, found that if you inoculate a susceptible horse with the blood of a sick horse, or a horse that is healthy, but has suffered from the disease, one usually causes an acute form of the disease, which in many cases may prove fatal, but if one inoculates the blood of a recovered donkey into a susceptible horse then the disease usually takes a much more modified form, and the animal obtains an active immunity.

This knowledge may prove of great economic value in the future. In order to ascertain how this treatment would answer in practice, I had arranged through the Principal Veterinary Surgeon to test its efficacy on a number of Argentine horses, but the stress of work incurred by the presence of East Coast Fever in my district prevented me so doing.

Nearly every year in this district someone loses a valuable imported stallion from Equine Malaria, but if this inoculation method should prove reliable then all animals that are to be turned out on the veld could be immunised in the early spring, and so one could avoid frequent disappointment and financial loss to progressive horse-breeders.

The Principal Veterinary Surgeon adds, "Quite recently Dr. Theiler has shown that Biliary Fever in the horse, mule and donkey is communicated by the common little red tick found chiefly under the tail."

Short Notes.

VOLUME X.—With this issue is begun Volume X. It may be of interest to readers to hear that, despite the general depression, the demand for the *Journal* is constantly increasing.

E.C. FEVER IN RHODESIA.—The letter from the Chief Veterinary Surgeon of Rhodesia to the Principal Veterinary Surgeon of this Colony should be read by all. The principles adopted are clearly stated and illustrated by examples.

THE WEATHER.—One half of the Natal meteorological year having gone by, a reference to the Returns will prove of interest. Generally, the half year just finished shows a decided improvement in rainfall when compared with the corresponding period of last year. During the present month, up to the 21st, there have been only one or two days upon which rain has not fallen in the vicinity of Maritzburg.

SOUTH AFRICAN PRODUCTS EXHIBITION.—Mr. T. R. Sim, F.L.S., left for London on the 11th inst. as Representative of the Natal Government in connection with the above Exhibition. The collection of samples—forestry, fruit, agricultural, pastoral, mineral, etc.—is most satisfactory and representative. Among the “exhibits” are four large polished picture frames made from different colonial woods. In these frames are mounted about 150 illustrations from the *Journal*.

BOT-FLIES.—“Bot-fly” writes:—“A Short Note in the next *Journal* on ‘Tansy’ would be of interest now in view of the fact that its use as a destroyer of the bot larvae is a good deal discussed. What is Tansy, and how and where does it grow, and will it grow here, and who supplies the seed or roots or whatever it is, and how is the physic made and used, and its effect on the bot and on the horse, and so on? The available knowledge here is that somebody heard that Tansy-tea killed some bots, and that it may be bought at the chemists.” Reference to the bot-killing powers of Tansy will be found in Vol. IV., page 661. Common Tansy is a bitter aromatic plant with small yellow flowers, common on old pastures in England. A few years ago Mr. Pitchford conducted experiments with Tansy on horses suffering from bots. Owing to the pressure of other work at the time the experiments could not be completed, but so far as they were carried the efficacy of the remedy was, says Mr. Pitchford, fully proved.

GEOMETRICAL PROGRESSION.—How quickly life—animal and vegetable—will increase under favourable conditions is known by all. Here is an example culled from Sydserff’s “Treatise on Bees,” published in England in 1792:—“Suppose a swarm of bees at the first to cost 10s. 6d. and neither the swarm to be taken but to do well and swarm once a year—bees must be naughty if they dare to do otherwise—what will be the product for fourteen years and what the profit, if each hive is sold at 10s. 6d.? One year, 1 hive, profit, nil; 2 years, 2 hives, profit, £1 1s.; 3 years, 4 hives, profit, £2 2s.; 4 years, 8 hives, profit, £4 4s.; 14 years, 8,888 hives, £4,503 16s. Deduct 10s. 6d., what the first hive cost, and the remainder will be clear profit.” These figures with respect to the profits are of the class which fascinate townsmen when meditating on the attractions of farming. An interesting subject of life-increase in South Africa is afforded in the dowry gifts of a cow to girl children when born. This system of providing *dots* was at one time common among the Boers. If the girl’s cows did reasonably well—quite apart from the substitution of heifer calves for the bull calves dropped—the progeny, by the time the successful swain came along, was a fine big herd, and, even in the days of big farming, must have made a very apparent gap into the paternal troop when taken away. Can any reader give an authentic instance of a successful marriage portion from one cow?

O.R.C. REGULATIONS.—Inconvenience has been experienced by farmers taking sheep and goats from Natal into the O.R.C. For moving this stock it is necessary to be provided with the certificates and declarations specified in the Proclamations of the O.R.C.; full information may be obtained from the Stock Inspectors of the Veterinary Department.

OLD COUNTRY LIFE IN ENGLAND.—A charming and appropriate book for the bookshelves in country houses is "An Old English Home," by the well-known author, S. Baring-Gould. It has now been published eight years, and should be procurable at a low price. The origin of proprietorship in land is first dealt with, and then there are chapters on manor houses, old furniture, the parish church, the village inn, the farmhouse, the village doctor, and so on, every subject being dealt with historically and enlivened with genial humour. In the chapter on "The Parish Church" is related one of the drollest stories imaginable.

"ANNUAL REPORTS."—In the October issue of last year we referred to the general absence of interesting matter in the Annual Reports of Agricultural Associations. *Inter alia* we wrote:—"Practically every man in the honourable position of President of an agricultural association knows from experience or observation of something from the vast subjects of stock management and agriculture which would be of value to many of his fellow Colonists and consequently to the Colony at large, and yet, unfortunately, only rarely is the splendid opportunity turned to the best account." Since then two Annual Reports have appeared—one by Mr. Thos. Stead and the other by Mr. John Marwick—which go to confirm the opinion that these reports may be charged with information and criticism of valuable and interesting character. It is to be hoped that in the future the majority of the Reports will be of the nature of those just referred to.

THE COST OF COOLIE LABOUR.—It is not all employers who know the cost of coolie labour. Mr. C. Gundelfinger, in a letter to the *Mercury*, works out the cost—presumably for Coast employers—as follows:—"The actual wage which has to be paid over to an Indian during his five years' indenture is 12s. 6d. per month on an average. His passage money, which has to be refunded to the Indian Immigration Trust, is £22 10s., or equal to 7s. 6d. per month. The rations he has to be supplied with average, according to the market price ruling, 9s. 6d. to 10s. 6d. per month. Then there are medical fees, hospital fees, and lodging. Furthermore, even if an Indian, after being brought here, is incapable through health, you still have to pay part of his passage money besides 1s. per day hospital fees, whilst he is here—a large expense indeed. The actual expense of indentured labour is not 15s. per month, or less, as my friend points out, but reaches the figures of anything from 32s. 6d. to 35s. 6d. per month."

ROSETTA CO-OPERATIVE ASSOCIATION.—A farmers' co-operative association has been formed at Rosetta. The directorate is composed of three well-known colonists—Mr. Cotton Acutt (chairman), Mr. Graham Hutchinson, and Mr. Bede Crompton. A speciality is to be made of table and seed potatoes. The Upper Mooi River district has for years held high reputation for its potatoes, and no doubt, with the guarantee of the Association, a big business should result. Mr. Edward E. Downing is the manager.

LOCUSTS FOR FOWLS.—A correspondent, writing to *The Farmers' Advocate*, says:—"My experience has been that, if obtainable, locusts are more valuable as a protein forming food for poultry than meat, green bone, bone meal, or any of the so much advertised foods. Marketable locusts should, of course, be properly dried, and in this state can easily be turned into meal by running through a bone-crushing machine or grain kibbler. In this form they should be fed with the morning wash, to adult birds one-third of a ration three times a week. To young chickens and ducklings a more liberal supply, up to a daily feed, can be given with advantage. With laying hens I found the one-third ration improved the colour of the egg, ensured greater fertility, and enhanced the condition of the whole flock. So convinced am I of this that so long as I can get the supply of locusts, I shall never be without them."

HOLLOW BUILDING BLOCKS.—It is curious that in this country hollow concrete blocks are not more used for building. In the eyes of most people a stone building is preferable to a brick building even if the bricks are of the very best quality, and yet a building of hollow blocks, having at the distance of a few feet an appearance indistinguishable from freestone, can be erected at a smaller cost than one made of bricks. And the former building will have this advantage over both solid stone and brickwork—it will be damp proof. At Durban there is a Syndicate—Sir B. W. Greenacre, chairman—which makes the blocks for sale, or, what is better for building at a distance, will make them on the spot. This Syndicate gives the following as the special advantages and features of hollow block buildings:—"Indistinguishable from real stone. Practically indestructible, becoming harder the longer they are exposed to the weather. Being made in a machine geometrically true, blocks are all uniform in size and finish. Smooth inside and out, requiring no plastering, simply pointing inside to be ready for painting or papering. The blocks are manufactured of best Portland cement and sand, strongly compressed, with hollow centres, thus forming non-conducting air chambers, making damp and sound-proof walls, perfectly cool in the hottest weather. The blocks are laid dry, on a perfectly level foundation. Liquid cement grout is then poured into the small vertical holes or channels, leading to the channels formed in the upper and lower surfaces of the block, thus making a perfect bond. The ordinary or standard

block for a 9in. wall is 18in. long, 10½in. high, and 9in. thick, being equal to twelve bricks when laid. The weight is about half that of brickwork. Owing to the great saving of labour, the cost of a wall built of these blocks is only about two-thirds that of brickwork plastered and tuck-pointed." In the course of a speech at a demonstration at the works of the Syndicate, Mr. Fletcher, the well-known Borough Engineer of Durban, said, according to a newspaper report, that the method of binding the blocks together in a wall made the wall watertight. Fourteen or fifteen years ago, when he built his house on the Berea, he was particularly careful—as careful as if he was doing it for the Corporation—(laughter)—to have a dry house. Despite the fact that he used the very best bricks, one side of the house was taking in water still. If he was building again he would use hollow blocks. Mr. J. H. Skinner is manager of the Syndicate, the offices being in the Imperial Buildings, Durban. Recently being attracted by a picture of a hollow-block barn in an American farmers' publication, we wrote for fuller information. In reply we received from the Prettyjohn Co., 600, North Sixth Street, Terre Haute, Ind., U.S.A., a beautifully got up and instructive pamphlet describing and illustrating their plant for hollow block-making. The pamphlet has pictures of imposing five storey buildings, churches, residences, barns, and little village stores.

DRY FARMING.—In the September issue of last year some observations were made in this column on an article which had appeared in the *Century Illustrated Monthly Magazine* on dry farming in the semi-arid districts of the United States. With the object of getting fuller information and of authentic character, we applied to the Agricultural Department of the U.S.A., and, in reply, a pamphlet on the subject has been courteously sent. To a considerable extent this pamphlet confirms the accounts of success obtained by the "dry" farmers. These are the facts which stand out most prominently. The soil is of first-class character, constant cultivation is necessary, and, as "insurance" of the dry-farm, some irrigation is indispensable, the stored water to be used for saving crops. The writer of the pamphlet, Mr. Elwood Mead, Chief of Irrigation and Drainage Investigations, says:—"It is believed that there are a few localities in the arid region where enough water cannot be had for the irrigation of 1 to 10 acres on each section. It is remarkable how much can be done with a little water where rightly used. The irrigation of 1 acre on a dry farm will make it possible to grow a wind-break of trees around the farmer's house and barns, which will serve as a shade in summer and one of the best of protections against winds and storms in winter. No range stockman needs argument to convince him of the value of these wind-breaks, and everyone who has seen the shimmering waves of heat which rise from these gray and dusty plains in summer appreciates the value of shade and foliage in midsummer. It will ensure a green lawn for the

house, the growing of a wide range of fruits, and a still larger list of the best vegetables which can be produced anywhere. This will do one of two things for the farmer: It will save him from an excessive bill for canned goods or from living on a monotonous diet. If 5 acres of land are irrigated and 1 given to trees, orchards, and garden, 4 will be left for field crops. Planted to alfalfa this will produce 15 to 20 tons of hay—enough to support the farmer's milch cows and work horses. That much land will support a farmer in dry years if he grows on the rest of his farm." Irrigation thus appears to be necessary to save the farmer from the risk of absolute ruin. Mr. Mead elsewhere remarks:—"Nothing can be more dreary or discouraging than the aspect of the dry farmer's home in midsummer. Without shade trees, without green grass, without fruit, the dead, dusty, and lifeless appearance of the landscape is monotonous beyond measure. It makes one realise that 'a world without turf is, indeed, a desert.' The fact that many of these farmers are prosperous does not remove the need for trees, fruit, grass, and gardens, nor lessen the value of these features of a home as seen on irrigated farms in the same region. The dry farm needs enough irrigation to provide these things. It needs it for the comfort of the family. It needs it for the opportunities it will give to make a living in dry years, as well as larger profits in wet ones, and it is only by supplemental irrigation that the limits of settlement can be pushed westward across the driest part of the semiarid belt." The U.S.A. authorities are devoting much attention to the best methods for providing this partial irrigation—by pumping, by storing of storm waters, and by irrigating with flood water. The results obtained from 2 or 3 acres irrigated by water from wells pumped by wind mills and oil engines are astonishingly good. The lessons for South African "dry" farmers are not unfamiliar—do everything reasonable to have water for irrigation, cultivate constantly, and grow only the most drought-resistant varieties of the crops wanted.

Wattle-Bark at Ravensworth.

THE illustration facing this should have accompanied the "interview" by Ergates with the Hon. F. T. Angus, M.L.C., which appeared in the November issue of last year. The Ravensworth factory in a sense is the centre of the estate. Here are sheds for drying bark, here is the engine power for chopping the bark and stamping it into sacks, and here also, in the fitting and carpentry shops, is done the large amount of mechanical work incidental to a wattle-bark estate. All the factory work is under the supervision of Mr. F. B. Angus.



WATTLE-BARK.-FACTORY AT "RAVENSWORTH."

The Hon. F. T. Angus, M.L.C.

Experimental Stations—Programme, 1907.

THE following is a programme of undertakings now in hand and projected for the current season, together with interim reports detailing progress during period ended 31st December, 1906. An effort has been made to organise a general scheme of experiment bearing relation to the more urgent of local agricultural problems. It is clearly recognised, however, that this is by no means exhaustive, based, as it is, upon observations made at a relatively small number of centres, and, in view of my recent arrival in Natal, suggestions of difficulties experienced in any branch of agriculture will be welcomed and made the basis of further investigations.

E. R. SAWER,

Director, E.S.

CENTRAL EXPERIMENTAL FARM, CEDARA.

AGRICULTURE—GENERAL.

(a) Reclaiming of swampy vleis by tile and open drainage, subsoiling, lining, etc. The employment of water thus conserved in irrigation of reclaimed lands. Determination of outlay involved in these operations.

(b) Establishment of a truck farm under irrigation for the determination of the best methods available for the production of asparagus, celery, rhubarb, onions, etc., on the scale of field crops, and the place of pitting and forcing in such a scheme.

(c) Hillside cultivation and the prevention of surface washing by subsoiling, contouring, catchment drainage and the growth of inter-cultural crops.

(d) Deep cultivation (subsoiling) and its effect upon physical character of soils, water content in wet and dry seasons, stability of mineral manures, and growth and yield of staple crops.

(e) Rotations, and especially the cultivation of catch crops with drilled maize.

(f) Determination of absolute and relative values of different classes of kraal and stable manures; effect on physical characters, water content and surface-washing of soils; influence on growth and yield of staple crops; place in rotations; storage and conservation of such manures.

(g) Veld improvement; conservation from grass fires and influence on chemical and organic composition; increase in carrying capacity and feeding value by manuring, cultivating, etc.; introduction of European grasses for summer, and drought and frost-resisting forage plants for winter grazing.

(h) Efficiency of tillage implements and cultivation tools; relative

draught as determined by a tractometer; effect of shallow and deep **surface** cultivators on growth and yield of staple crops.

(k) Green fallows and the application of green manures to soils, showing low natural fertility or deterioration.

MAIZE.

(a) Cross-breeding and selection of local varieties adapted to cultivation in the highland, midland and coast districts respectively, with early, medium and late maturity.

(b) Cross-breeding and selection of local varieties for milling, stock-feeding and silage respectively, with lower or higher proteid, starch or oil content, abundant or scanty leaf-growth, finer or coarser stalk, etc.

(c) Cultivation of maize with such catch crops as field beans and peas, wheat, oats, rye, rape, mustard, buckwheat, flax, etc., and the determination of effect on growth and yield.

(d) Effect of subsoiling, deep and shall surface cultivation, close and wide spacing, hilling and listing on growth and yield of grain and stover.

(e) Effect of heavy and light dressings of kraal manure, with and without additional mineral fertilisers, on the growth and yield of maize, and subsequent condition of the soil.

WHEAT.

(a) Breeding and selection of frost and drought-resisting winter wheats with special reference to the requirements of highland districts.

(b) Breeding and selection of rust-resistant spring wheats.

(c) Cultivation of winter-wheat on drained vlei land without irrigation; use of wheat harrow; effect of drainage, subsoiling, alkaline manures and seed selection on rust infection.

(d) Influence of grading of seed upon growth and yield.

(e) Influence of quantity of seed sown upon growth and yield.

(f) Cultivation of winter wheat as a catch crop with maize.

OATS.

(a) Breeding and selection of an early maturing forage oat.

(b) Breeding and selection of a rust-resistant, heavy, threshing oat.

(c) Influence of weight of seed sown upon growth and yield.

(d) Cultivation of oats as a catch crop with maize.

BARLEY.

(a) Breeding and selection of beardless types with high proteid content for stock-feeding.

(b) Breeding and selection of malting types with high starch content.

(c) Cultivation of barley as a catch-crop with maize.

MILLET.

(a) Relative yields, grain and straw, growing periods and nutritive values of different types of millet.

(b) Influence of mineral and organic manures dressed separately and in combination.

(c) Influence of quantity of seed and planting distance on growth and yield.

POTATOES.

(a) Influence of size of sets and distance of planting.

(b) Influence of sprouting of sets.

(c) Influence of mineral manures.

(d) Influence of organic manures.

(e) Influence of subsoiling, ridging and level cultivation.

(f) Influence of application of Vaporite, Bordeaux Mixture, and Paris Green.

(g) Selection of blight-resistant and heavily-bearing strains from main crop varieties.

(h) Breeding and selection of local types from seed.

(k) Experimental culture of newly-evolved types.

(l) Winter storage.

ROOTS (INCLUDING MANGOLDS, TURNIPS, BEET, SWEDES AND HORSE CARROTS.)

(a) Influence of subsoiling, deep and shallow ploughing on growth and yield.

(b) Influence of organic manures, with and without the addition of mineral fertilisers, on yield, chemical composition and nutritive value.

(c) Winter storage.

STOCK.

BUTCHER'S CATTLE.

(a) Winter-feeding of truck loads (or smaller lots) of Devon, Aberdeen-Angus and native steers with variously compounded rations.

(b) Determination of increase in live-weight by periods as influenced by character and quantity of rations and hereditary capacity of different types.

(c) Estimation of cost of rations and management, and consequently of increase in live-weight.

(d) Slaughter-tests for determination of proportion of dead-weight and character of carcasses as influenced by rations fed.

(e) Feeding of butcher's calves with full milk and fortified skim-milk rations.

(f) Production of "baby-beef" by the use of concentrated feeds.

BUTCHER'S SHEEP.

(a) Establishment of a flock of butcher's (Persian) sheep.

(b) Determination of increase in live-weight by periods due to veld grazing alone, and to grazing combined with variously compounded rations.

(c) Estimation of cost of rations and management.

(d) Slaughter tests for determination of proportion of dead-weight and character of carcasses as influenced by rations fed.

PIGS.

- (a) Paddock feeding with rape, ground nuts, kale, beans, etc.
- (b) Determination of gains in live-weight due to paddock-feeding and variously compounded rations.
- (c) Slaughter tests, and determination of quality of carcasses as affected by system of feeding.
- (d) Curing and determination of quality of bacon as affected by rations fed.

POULTRY.

- (a) Establishment of a model poultry farm.
- (b) Determination of relative advantages of breeds in local conditions.
- (c) Influence of rations on health, egg production and growth of pullets.
- (d) Cost of production for eggs and pullets, as determined by cost of rations and management.

WINKEL SPRUIT EXPERIMENTAL FARM.

AGRICULTURE—GENERAL.

SUGAR CANE.

- (a) Influence of distance of planting and the application of mineral manures on growth and yield of cane.
- (b) Establishment of plantations with recently introduced varieties.
- (c) Analytical determination of variations in sugar content due to variety and cultural methods.

TEA.

- (a) Establishment of an experimental garden.
- (b) Analytical investigations into the alleged deterioration of tea-lands, and determination of the influence of mineral and organic manures on continued growth and yield.
- (c) Influence of mineral and organic manures, and distance of planting on annual yield.

And later:

- (d) Influence of different methods of pruning on continued growth and yield.

COFFEE.

- (a) Establishment of an experimental plantation.
- (b) Study of leaf-disease and determination of the efficacy of local remedies, viz., firing with a grass mulch, etc.
- (c) Influence of shade and shelter as furnished by native trees in partial clearings.

And later:

- (d) Influence of mineral and organic manures on health and yield.
- (e) Employment of indigenous (Inhambane) coffee as a stock for grafting.

(f) Cross-breeding and selection of indigenous coffee with a view to its adoption as a variety relatively resistant to leaf-disease.

FIBRES.

(a) Organisation of plantations with ten selected varieties of Sea Island, Egyptian and Long Staple American Upland cottons, which have given best relative results among an extensive number of types submitted to experimental culture in former seasons.

(b) Organisation of Sisal and Mauritius hemp plantations to determine influence of planting methods on growth and yield, suitability of soils and their influence on character of fibre.

(c) Organisation of a Ramie plantation to determine relative growth and yield on the coast and in the midland districts, total weight of fibre produced and cost of production.

MAIZE.

(a) Selection of a heavily-bearing strain of Boone County Maize with long growing period, suitable for cultivation on the coast.

(b) Treatment of newly-cleared bush land in preparation for maize; influence of burning, liming, and the application of organic and mineral manures.

(c) Distance of planting, hilling, and the introduction of catch crops, such as lima bean and cow-pea.

BARLEY.

(a) Selection of a variety suitable for winter stock feed.

(b) Selection of a variety for malting purposes.

(c) Influence of mineral manures on yield of grain and straw.

POTATOES.

(a) Times of planting in relation to yield and blight infection.

(b) Influence of size of sets, distance of planting, and sprouting of sets.

(c) Influence of organic and mineral manures on growth and yield.

(d) Influence of spraying and de-flowering on growth and yield.

(e) Selection of blight-resistant and heavily-bearing strains from main crop varieties.

STOCK.

SHEEP.

(a) Determination of the suitability of Persian sheep to the coast districts.

(b) Influence of veld grazing with and without the addition of variously compounded rations on increase in live-weight over periods.

(c) Cost of rations and management, and consequently of increase in live-weight.

PIGS.

(a) Paddock-feeding of pigs on ground nuts, sweet potatoes, rape, cowpea and arrowroot.

- (b) Influence of paddock-feeding and various rations compounded with grain, cane refuse, mollasses, etc., on gain in live-weight.
- (c) Cost of production of pork under a system of paddock-feeding.
- (d) Influence of such a system on quality of cured products.

WEENEN EXPERIMENTAL STATION.

IRRIGATION—GENERAL.

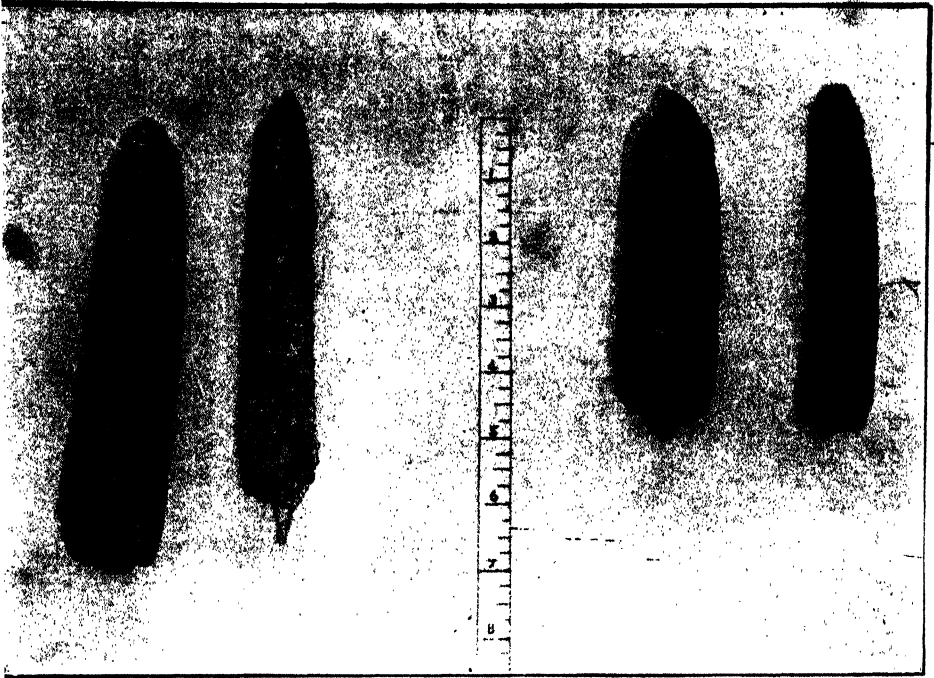
- (a) Demonstration of methods employed in grading and surfacing land for irrigation.
- (b) Relative effects of flooding and furrow irrigation on staple crops, and comparative costs of operations.
- (c) Open and tile drainage, relative costs of operations, and influence on growth and yield of crops under irrigation.
- (d) Service of irrigation waters and influence of quantities upon growth and yield of staple and truck crops.
- (e) Irrigation in relation to mineral and organic manures as applied to drained and undrained lands.
- (f) Investigation of alkaline precipitation and the influence of drainage; analysis of irrigation and drainage waters, alkaline deposits and soils

CROPS UNDER IRRIGATION.

- (a) *Lucerne*.—Influence of varieties; broadcasting and drilling; surface cultivation; manuring; quantities of water.
- (b) *Wheat and Barley*.—Influence of varieties; times of sowing; sub-soiling; drainage; alkaline manures; grading of seed; quantity of seed; drilling and broadcasting; zigzag and wheat harrows; cutting and feeding early growth, etc.
- (c) *Potatoes*.—Influence of sprouted and unsprouted sets; ripe and unripe seed; number and season of services; green manures; methods of applying water, etc.
- (d) *Maize*.—Influence of water on growing period; yield of grain and stover; soil temperature; rust and bacterial rot.
- (e) *Truck Crops*.—Service of water required by asparagus, celery, onions, rhubarb, etc., and its influence on yield and quality of produce.

TOBACCO.

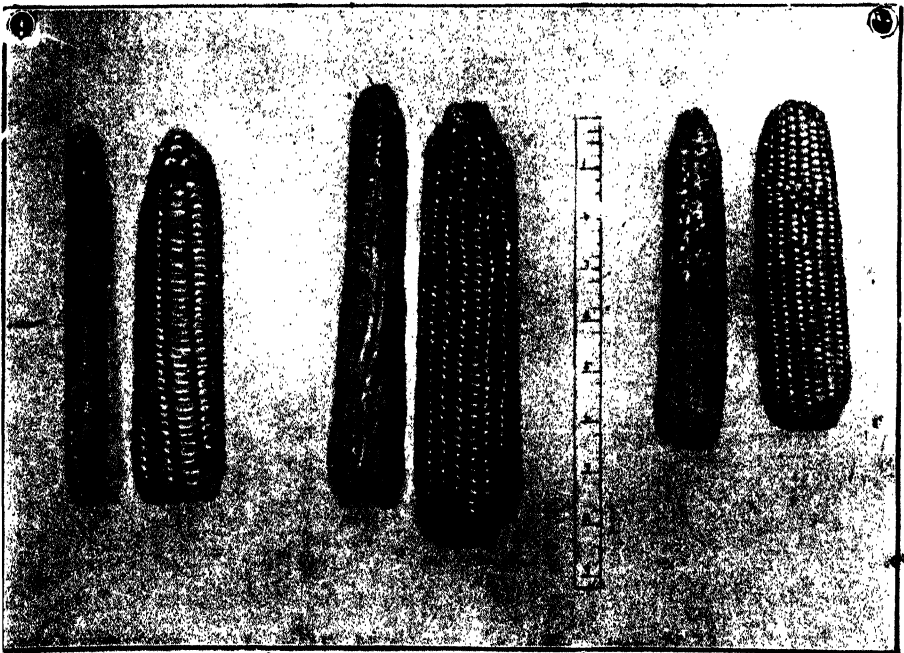
- (a) Experimental cultivation of Sumatra, Cuban, Virginian and Turkish varieties.
- (b) Fire-curing of Virginian Bright Leaf for cigarettes.
- (c) Sun and fire-curing of Turkish Leaf for cigarettes.
- (d) Air-curing of Sumatra and Cuban Leaf for wrappers and fillers of cigars.



SUGAR MAIZE OR SWEET CORN.

1. Stowell's Evergreen.

2. Dwarf Early.



DENT MAIZE (WHITE).

1. Hickory King.

2. Boone County.

3. Silver Mine.

Maize Cultivation in South Africa.

WITH SPECIAL REFERENCE TO NATAL.

By E. R. SAWER, Director Experimental Stations.

SIR J. B. LAWES, the great pioneer of scientific agriculture in England, speaking of maize on a memorable occasion, paid the following tribute to the world's leading food plant:—"My chief regret in not visiting America is that I shall die without beholding what I conceive to be the most superb crop that grows, as it is, in itself, the most valuable."

From its legendary origin as the gift of the Mondamin, the Great Spirit of the Indian, recounted by Longfellow in his agricultural epic, *Hiawatha*, to its employment at the present day, not as a rude, primitive food for man, but the basis of a hundred manufacturing industries, the history of maize has been nothing less than a romance. In 1498 Columbus writes to Ferdinand and Isabella from the Island of Hayti, describing a new cereal unknown in Europe, Asia, or Africa, grown by the natives in fields eighteen miles long and called by them "mahiz." Standing maize won in battle from their Indian foes by the early Puritan settlers in Eastern America proved ample argument for the adoption of the newly-found crop as their staple, which was forthwith destined to become the chief cereal food of the pioneers of two continents and the salvation of their stock during the hungry winters prevailing in the lands of adoption. Nor has its popularity declined with the days of the Pony Express and the Voortrekker, for the advance of civilisation has but multiplied its uses. Where climatic conditions favour the growth of the crop, maize is yearly becoming, with the development of the art of cooking, a more important element of human food. Where maize is grown extensively, live stock industries flourish, and in sub-tropical regions the geographical distribution of maize is in a general way an index to the distribution of live stock. And during the past few years scientific study and inventive genius have combined to demonstrate economic possibilities for maize and its products, which are as yet but dimly realised by the cultivator of the crop. At the Paris Exposition of 1900 there was exhibited a case containing one hundred and eight separate commercial products manufactured from maize. Alcohol, whisky and malt liquors are distilled from the grain. Glucose factories annually absorb more than sixty million bushels in the preparation of a product used in the manufacture of table syrups and confectionery. Maize dextrin and gum are employed for sizing cloth, and various grades of starches, from edible to laundry, are produced. Cellulose constructed from the pith of the stems finds employment in the manufacture of explosives, and as a packing for the sides of war vessels, owing to its pro-

perty of rapidly swelling on being pierced and preventing further ingress of water. Stem fibres go to form paper, the husks mats and mattresses, and it has indeed been said that there is as much economic value in the stalks, when fully exploited, as in the crop of grain they bear. By-products of milling and manufacture are known and sold as germ oil, germ oil meal, gluten and gluten meal, hominy, distiller's grains, etc., and in demonstration of the limit to which the work has been carried, when the pith is removed for the manufacture of explosives, the remainder of the stalk, with husks and leaf-blades, is ground into a coarse meal and sold as "the new corn product." The Maryland Experiment Station found this more digestible than Timothy hay, for which it was successfully used as a substitute in feeding horses.

CLIMATE.

In the country of its origin there exist clearly defined areas known as "corn belts," within whose limits is found the best combination of temperature, sunshine, rainfall and soil for the successful production of maize. Within the individual Colonies of South Africa maize districts will ultimately gain recognition as possessing a similarly happy association of natural advantages. Outside such areas, where the absence of any one of these factors limits successful production, other crops will, as a general practice, be chosen, though men of special skill and intelligence may wisely work against peculiarities of soil or climate. It is in this connection that careful records of temperature and rainfall collected from a large number of stations over a period of years become invaluable to the farmer wishing to make a profitable selection of crops, and agriculturists are urged in their own interests and those of the Colony at large to devote attention to climatic variations occurring from season to season, and their apparent influence on the growth and productiveness of crops. A study of such influences, and a determination of the extent to which they may be controlled or modified by methods of cultivation, is the first step towards securing enhanced yields and further reductions in the cost of production.

Influence of Temperature.—It is the temperature obtaining during the growing months of January, February and March, rather than the mean for the whole year, and the temperature of the soil rather than of the air, which affect the growth of the maize crop. Sunshine is again a factor which is not fully expressed by thermometer readings, and yet exercises a powerful influence on production. The bulk of the American crop is grown where the mean soil temperature during the month of July ranges between 70° and 80° F. and the former figure (February being substituted for July) may be taken as our minimum for profitable cultivation. Maize seed will not germinate at a lower temperature than 55° F., and if planted will rot in the ground. The character of the soil largely determines its temperature, and a well-drained, warm

soil may register a foot below the surface some 10° excess of a reading taken in the open. On the other hand a cold, water-logged soil suffering from want of drainage, may prove cooler than the overlying air, and no plant perhaps is more susceptible to "wet feet" than maize. Continued rains may on such land prove injurious rather than beneficial by further reducing the temperature of the surface and subsoil. Within certain limits no relationship may be traced between yield per acre and temperature, especially when the readings exceed the minimum stated above, but as soon as they fall below this, the maturity of the grain, and therefore its saleable yield, will be affected. Unsound grain is frequently shipped from colder districts lying beyond the limits of the economic maize area, especially after inclement seasons. The following statement from the New York State Station illustrates the effect of a fall in temperature in such a situation on the character of the grain. It will be observed that this fall bears an apparent relationship to a relatively heavy rainfall, and that the yield suffers little in quantity, but much in storage capacity. This furnishes but one of the many available arguments in favour of the thorough drainage, whether natural or artificial, of the maize field:—

Year.	Maturity of Grain.	Mean Soil Temperature.	Rainfall.		Yield in Bushels.
			June and July.	September and October.	
1884—	Well ripened	71.4°	8.14	3.34	63.8
1882—	Fairly ripe	67.8°	8.91	1.83	50.2
1883—	Rather moist but safe				
	binned	63.5°	13.53	4.64	58.6
1885—	Very moist, moulding in				
	bin	67.5°	14.67	4.64	58.8

Influence of Rainfall.—Subject to the above reservation, the yield of the maize crop bears a definite relationship to the rainfall, and to its distribution during the four growing months, December to March inclusive. King* has determined the amount of water evaporated from the maize plant and the surrounding soil to be in Wisconsin 270lbs. for each pound of dry matter grown, equivalent to 2.4 inches for each ton; this is only about half that required by oats and clover. Maize is, however, very greatly influenced by the water supply during the period of most rapid growth, which in South Africa corresponds with the months of January and February. Hunt** has ascertained that the growth of maize in one week in July in Illinois to be equal to 1,300 pounds of dry matter per acre, which would require, according to the experiments of King, 1.5 inches of rainfall. At such times, unless the physical conditions of the soil are the best, the plant is apt to suffer from drought. Heavy rains and cloudy weather, on the other hand, during November

* "Physics of Agriculture," page 139.

** "Cereals in America," page 207.

and December, are likely to decrease yields. The most favourable conditions for the growth of maize are comparatively heavy rains at considerable intervals, with hot, sunshiny weather in the meantime. Deep cultivation and drainage will in all cases modify the undesirable effects both of excessive precipitation and deficient rainfall.

SOILS AND MANURES.

Maize is influenced perhaps in greater degree than any other cereal by the character of the soil in which it is grown. This factor cannot be regarded as beyond the control of the farmer, for field soil becomes, when cultivated for a period of years, what is virtually an artificial product adapted by the skill of the cultivator in both its chemical and physical features to the specific needs of the crops grown thereon. Many of our vlei soils and swamps contain reserves of plant food, which would suffice to meet the requirements of several successive maize crops without being supplemented by commercial fertilisers. The texture and mechanical conditions of such soils, however, frequently render these natural resources unavailable until such time as physical features have been modified by a system of subsoil drainage. Some compensation, on the other hand, is found for the relatively low natural fertility of hill-side lands in a generally excellent natural drainage, but successful cultivation will include at the outset a system of manuring calculated to make good deficiencies in mineral and organic food supplies.

An average crop of maize, yielding ten muids of grain and four tons of stalk per acre, will remove from the soil approximately 88lbs. potash, 80lbs. of nitrogen, and 55lbs. of phosphoric acid, and the standing problem confronting the maize grower is the determination of the best and most economical method of returning these substances to the soil, and the avoidance of impoverishment due to constant cropping. That maize, at its present market values, can be grown for a profit on some of the least fertile soils under cultivation in Natal has been amply demonstrated at the Central Experiment Farm, Cedara. The method employed has been the application to such lands of variously compounded dressings of chemical manures, and the results secured are briefly as follows:—On unmanured hill soils repeated cropping tends to rapid exhaustion, the fourth year's crop of grain being less than a quarter by weight of that secured during the first season, and cultivation ceased to be profitable after the second year. Dressed, however, with chemical manures the same class of land shows a steady improvement, indicated by better crops secured at the end of four years' treatment. The most striking feature of the results is the disastrous effect of leaving out the phosphates, without which the yield was little better than without manure at all; in fact, individual plots yielded less when nitrogen and potash were given than was obtained from the neighbouring unmanured plots. There was 25 per cent. less grain and 19½ per cent. less stalk harvested when potash

was omitted from the dressing, and the gradual exhaustion of the potash present in the soil is shown by the diminishing yield of grain from year to year when potash manures are not used. On the other hand increasing benefit is experienced from the repeated application of potash in combination with phosphates. A most satisfactory discovery was the fact that a little more grain and the same amount of stalk was secured without nitrogen than when this was supplied, and there is further apparently no progressive exhaustion of the nitrogen in the soil: this is in keeping with the experience of growers in other parts of the world, when maize is for this very reason coming to be regarded as a restorative rather than an exhausting crop. Wheat, oats and other similar daintily-feeding small cereals demand an ample supply of available nitrogen in the soil, and exercise a relatively exhausting effect, but maize possesses a wonderful capacity for foraging, and an ability to collect nitrogen in many forms, as well as other elements of nutrition. Whether the plant, in common with legumes, actually takes up nitrogen from the air, has not been definitely demonstrated, and some investigators prefer to attribute the supply to the increased formation of nitric acid in the soil during the hot months of the year when the growth of the maize plant is most rapid. It is a remarkable advantage which maize possesses over the other cereal grain crops in that it continues growing throughout the summer and ripens in the autumn, and that its most vigorous growth and assimilation ensue just when soil nitrification is most active, and when the other cereal crops have completed their development.

As alternatives to the use of highly-priced commercial fertilisers, and as means of keeping the land in good condition for growing maize, the writer would urge the importance and value of kraal manure and the rotation of crops in connection with stock-feeding. At the close of the current season it is trusted that there will be available from our own experiments concrete facts to support a plea for the use of organic manures. In the meantime one cannot do better than quote a single authentic experiment conducted by Professor Latta, at the Indiana Station. A series of alternate plots were dressed for two years with fresh horse manure amounting in all to about 50 tons per acre. The land had grown maize continuously for five years prior to the commencement of the experiment. No manure was used before or after. During the twelve years succeeding those when the manure was given, the average yield was nearly ten bushels per acre more on the manured than on the unmanured plots. The effect of kraal manure is thus more lasting and constant than that of the readily soluble commercial fertiliser; it supplies organic matter, or "body," to soils deficient in humus; it modifies the water content of such soils, maintaining more moisture in the upper three feet of the ground; checks surface washing during heavy rains; and frequently contains the necessary mineral elements, phosphates and potash, in the cheapest available form. One ton of well-

conserved kraal manure should contain nine to fifteen pounds of potash and nitrogen, together with four to nine pounds of phosphoric acid, and a dressing of ten tons per acre will, in terms of the requirements of the maize crop, as stated above, more than suffice to meet the season's call, and leave a residue available for consumption by succeeding crops. Hunt* instances cases where no influence whatever was obtained from the use of large quantities of commercial manures, but where the use of kraal manure increased the crop.

MAIZE IN ROTATIONS.

Apart from the direct benefit it may derive from a dressing of kraal manure, maize plays an important part in any rotation by preparing the soil and its manurial contents for the following crop, which would profitably be potatoes. The latter furnish the "money crop" of the farm, and are therefore fed on the choicest food. By ploughing under a heavy dressing of kraal or a green crop of legumes, and "straining" the humus thus obtained through a crop of maize, soil is secured which, if further fortified with a dressing of mineral fertiliser, should so increase the yield and quality of the potatoes, that the cost of cultivating the maize may well be debited to the latter crop, and the maize harvest be regarded as pure gain. Oats or wheat may then follow the potatoes without further manuring, and the rotation be completed with leguminous crop, such as soy bean or cow pea, which is either ploughed under or fed to stock. As stated above, the secret of this beneficial influence of maize lies in the fact that the hot summer is particularly favourable for the action of chemical and bacterial processes of the soil, including the changing of inert nitrogen into active nitrate or ammonia, and in converting kraal manure and all coarse material into available plant food.

The difficulty of finding staple and profitable crops to take the place of maize in rotation is being obviated by the far more extensive cultivation of feeding crops, and the above system may be modified by the substitution of roots, barley, flax, rape, ground nuts and other soiling crops to suit the requirements and convenience of individual cultivators, the general principle being maintained that heavy manures are to be given in the first place to the maize crop.

CATCH CROPS WITH MAIZE.

Closely related to the question of rotation is that of the cultivation of catch crops, which, regarded as a means of shortening the period occupied by the rotation and increasing the output of produce from a given acreage, is one of considerable importance. The inter-planting of drilled maize with such crops as soy and Lima beans, cow peas, wheat, oats and rye, rape, ground nuts, vetches, mustard, pumpkins, etc., is a

* "Cereals in America."

regular system in many maize districts, justified by lengthy experience of satisfactory results. Such catch crops may be introduced at any suitable time during the growth of the maize from planting to the last cultivation; the latter operation, if regularly performed, leaves the soil between the rows of maize in excellent tilth, furnishing a good seed bed for even such exacting crops as wheat and oats. In this connection it may be found advisable to increase the planting distance between the rows of maize to allow for the passage of a wheat drill during the month of February. The system may be justified by the fact that the yield of maize is little influenced, and on certain classes of soil may be even increased, by wider spacing. This fact has been particularly noticeable in coast plantations where maize planted among coffee with a spacing of ten feet between the rows has been found to give better returns than were secured from fields in which the standard spacings of thirty-six or forty-two inches had been adopted.

When a winter catch crop of wheat or oats is contemplated, a variety with a short growing period, such as barley-wheat or Indian oats, is advocated, which, maturing soon after the early rains, permits of spring ploughing and the December planting of the ensuing crop. If a feeding crop of legumes be required, this should be drilled between or in the rows of maize. Drilling is here preferable to broadcasting, as it allows of cultivation with weeder or horse-hoe. For our upland and midland districts no better crop could be selected than the soy bean, which is hardy, bushy in habit, and does not suffer from the attacks of beetle. In the coast section, however, the cow pea and the Lima, or kafir, bean, with a more tropical habitat, will give better results. Five or six foot spacing for the mealies, with a single intermediate drill of beans, will, in most cases, give a maximum return per acre. The legumes may be cured as hay or silage, or the beans harvested for a grain ration. When the ground is in need of organic manure, an alternative method is to broadcast the beans prior to the last cultivation of the maize and work the seed in with the horse-hoe. In this case the leguminous crops will not mature, but the vines will furnish a dense mass of green manure, which, if ploughed under in the autumn while the ground is still damp enough to rot the vegetable matter, will do much towards restoring exhausted land to fertility, and put "body" into soils lacking in humus. Rape and kale may be similarly drilled with the last cultivation of the maize and furnish excellent soiling crops for stock late into the winter, while buckwheat, flax and mustard may be broadcast late in January and harvested at or about the same time as the maize crop. That the system outlined above entails heavy applications of mineral manures in the shape of phosphate and potash, is not denied, for this is a necessary outlay wherever extensive cultivation is practised, and an economy is effected in other cultural operations when a two-crop course is organised during the single season on dry land. The nett profits gained from the

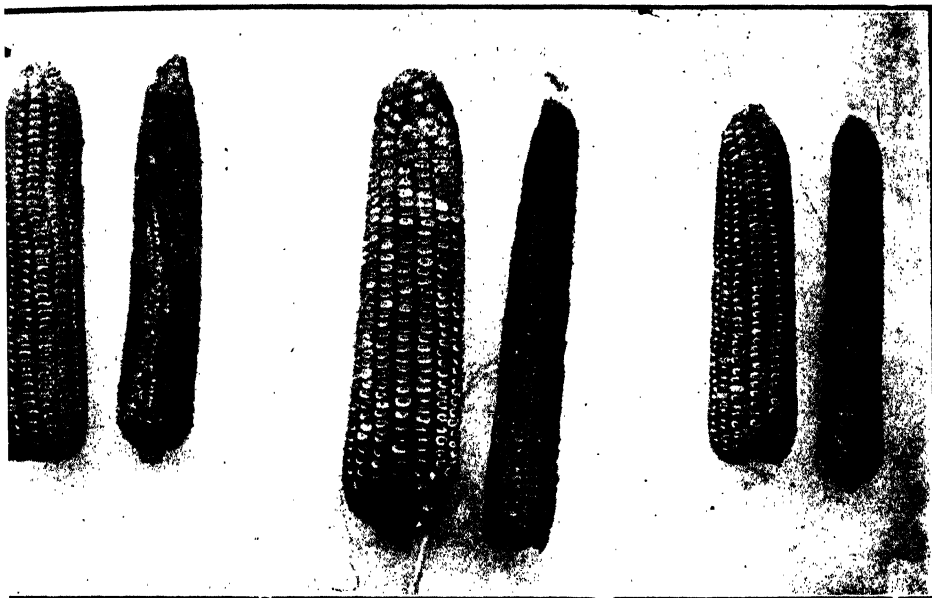
double harvest should far more than suffice to meet an additional manure bill, and the provision of an ample supply of winter stock-feed is a consideration of the first importance.

TYPES AND VARIETIES OF MAIZE.

A sound system of maize culture must be based upon a clear understanding of the different types and varieties, their habit of growth, characteristics, for relative suitability of a variety may, apart from other influences, modify the harvest secured and the consequent profits reaped. In making such a selection, two main considerations must receive attention, namely, the capacity to mature a crop in a given locality, and, secondly, the relative yield of the product sought, whether this be grain, forage, or both.

Botanically, all types and varieties of cultivated maize may be attributed to a single species, *Zea mays*, and their individual features are to be regarded as modifications induced by environment and cultivation. Nowhere has maize been found in the condition of a wild plant, and the original or parent type is therefore unknown. Concensus of opinion, however, favours Mexico as the original centre of distribution, and here the aboriginal Indians have for centuries grown corn resembling that discovered in the ancient tombs and burial mounds of the country. This possesses a soft, starchy, rounded kernal of very variable colour, red, blue and pinkish grains alternating with white or yellow. A closely related, if not identical, variety has been unsuccessfully cultivated in South Africa under the name of Cuzco or Peruvian maize. A reversion to such ancestral types frequently occurs in crops grown from seed which is the product of years of selection, and it has been a common South African experience to detect red or dark blue kernals in cobs raised from imported pedigree seed of undoubted parentage. The almost innumerable varieties of cultivated maize have been divided into a number of groups by Dr. E. S. Sturtevant, who has given the matter exhaustive attention with a view to placing the hitherto confused nomenclature upon a sound scientific basis. This grouping depends upon the internal structure of the kernel, and the presence of a husk or pod to the individual kernels of what is presumed to be the aboriginal form. If a grain of maize be cut through its longest diameter, the internal substance or endosperm will appear to consist of two parts, namely, an opaque, whitish portion, and a glossy or horny portion, and the difference of the following types is due to the arrangement and character of this endosperm, which often result in marked variations in the shape of the grain:—

Zea tunicata, *Pod Maize*.—In this group each kernel is enclosed in husks. The plants of this type are excessively leafy, and sucker abundantly. The tassels frequently bear kernels. The grain varies widely in colour, which suggests that this may be the primitive type, a supposition

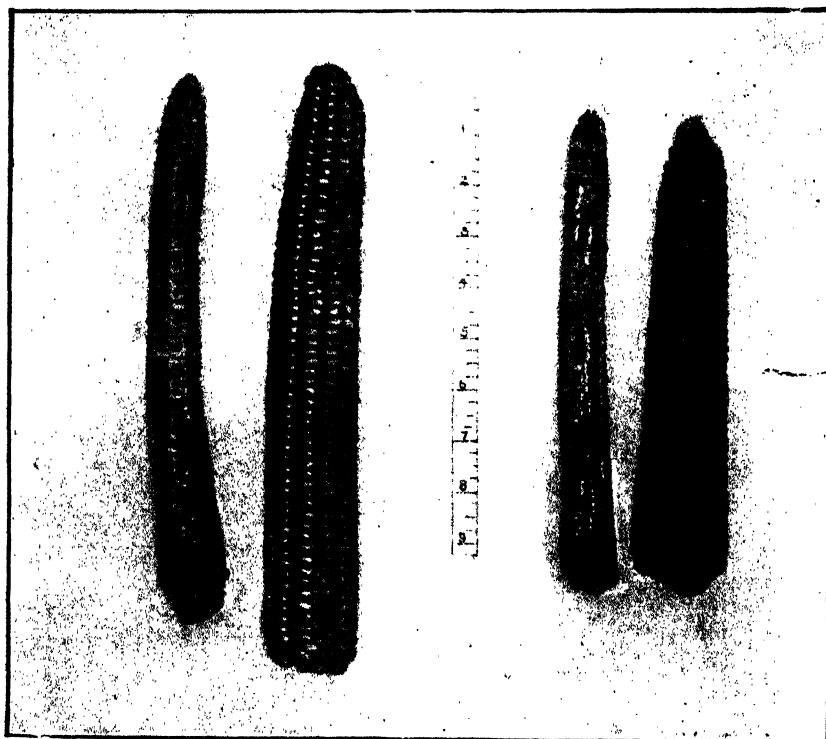


DENT MAIZE (YELLOW).

1. Yellow Dent.

2. Leaming.

3. Golden Eagle.



FLINT MAIZE.

1. Rural Thoroughbred Flint.

2. Long-fellow.

supported by the fact that cultivated varieties frequently revert to these characters. Pod maize has little commercial value and is rarely grown.

Zea erecta, Pop Maize.—This group is characterised by the excessive proportion of the horny endosperm, and the small size of the kernels and ear. The grain of the best varieties has a horny endosperm throughout, and, when exposed to a high temperature, explodes into a white, fluffy mass, the endosperm being everted round the germ and hull.

Zea indentata, Dent Maize.—This group is readily recognised by the occurrence of a starchy endosperm enclosed in a horny endosperm at the sides of the kernel, the starchy endosperm extending to the summit. By the drying and shrinkage of the starchy matter the summit of the kernel is drawn in or indented in various forms. In different varieties the horny endosperm varies in length and thickness, thus determining the character of the indented surface.

Zea indurata, Flint Maize.—Here the split grain shows the starchy endosperm completely surrounded by the horny endosperm. The latter usually prevents the grain from denting upon shrinkage, but if very thin at the top a slight dent may result.

Zea amylacea, Soft Maize.—This group is at once recognised by the absence of horny endosperm. Owing to the uniformity of the shrinkage in ripening there is usually no indentation, yet in some varieties an indentation may more or less frequently appear, but splitting the kernel invariably determines the class.

Zea saccharata, Sweet Maize.—A well-defined group characterised by the translucent, horny appearance of the kernels and their more or less crinkled, wrinkled or shrivelled condition.

Of the above types sweet and pop corns are cultivated rather as vegetable garden or truck farm crops, while soft or bread maize has little to recommend it for local adoption, requiring, as it does, a long growing period, storing badly, and being very subject to the attacks of insects and fungoid diseases. The Dent and Flint types therefore alone merit detailed attention as the basis of our field crops. Within these types numerous varieties have been evolved with characteristic features. The latter are partly referable to the effects of climate and soil, but more particularly to that of artificial selection whereby they have been profoundly modified to meet the specific requirements of individual growers. Similar influences are now being brought to bear upon South African crops with the consequence that new features may be detected in varieties introduced at an earlier or later date from the New World. For maize is one of the most plastic crops under cultivation, and within two or three generations shows to a marked degree the effects of natural or artificial influences. It responds to selection as readily as do beets or live stock, and there is scarcely any limit to the value of the results which may be thus secured. Maize may be bred to mature within a longer or shorter growing period, for heavy foliage or light, for tall plants or

short, for ears placed low down or high up, for one ear or for two or more ears to the stalk, for heavy or light husks, for size and shape of ear, for size, colour and shape of kernel, for better milling qualities, for higher or lower contents of starch, oil or protein, for greater resistance to disease or insect attacks, and, most important of all, for increased yield.

DENT MAIZE.

This type includes the majority of varieties known to South African growers, which vary widely in growing period, character of ear, and size, shape and colour of grain. Speaking generally, they are characterised by the absence of suckers unless planted very thinly, by the presence of a single ear of rather large diameter carrying a relatively large number of rows, and by deep and wedge-shaped kernels.

The following have been widely cultivated in South Africa:—

Boone County, White.—Introduced from Indiana, U.S.A., and grown for several seasons in Rhodesia, Natal and Transvaal, where it is rapidly becoming a standard variety in districts favouring its growth. It is a rank feeder with extensive root system, and has yielded record crop on rich, heavy vleis. Stalk is coarse, stiff and not easily lodged by wind. Has been bred for large ears, and consequently matures slowly, taking 110 to 120 days in America, and from 135 to 150 in South Africa. Complete acclimatisation will probably shorten the local period of growth. Several ears may be set to a stalk. These are cylindrical, 8 to 12 inches in length, and 7 to 9 inches in circumference, according to fertility of soil. Cob white. Kernels deep, wedge-shaped and very closely fitting. Rows 16 to 24. Butts and tips well filled. Ears shell 80 to 88 per cent. of grain, weighing 10 to 16 ounces. Hardy and resistant to rust. Recommended for silage.

Silver Mine, White.—Introduced from Illinois, U.S.A., and already a favourite with many South African growers. Resembles Boone County, but not so sturdy in growth, and has an earlier maturity, the growing period being from 100 to 110 days in the United States and 120 to 130 in South Africa. Ears sligher and smoother, and shelling a higher percentage of grain, the standard being 90 per cent. Length should reach 9 inches and circumference 7. Cob small, white. Kernels deep, closely fitting and creamy white in colour. Number of rows 16 to 20. Stands next to Boone County in point of yield of grain. A good silage crop.

Hickory King.—An early introduction from the Southern States of North America, where it is grown on the less fertile upland soils. This variety possesses an ability to make a fair crop in adverse conditions, and should be chosen for lighter, sandy soils. In such a situation, or when dry weather is experienced during the growing season, it will in all probability yield a better return than the above. It is not, however, a gross feeder, and on very fertile lands cannot take

advantage of the available plant food to the same extent as the larger varieties. There is an early limit to the size of the ears, and, as far as can be observed, there is no tendency to set a larger number to the stalk when conditions warrant this expansion. Ears from 6 to 8 inches in length and from $4\frac{1}{2}$ to $6\frac{1}{2}$ in circumference. Cob is small and should be white. Kernels broad, thin, square and horny white with a white-cap. Several strains are grown with a varying number of rows, of which that with an eight-rowed ear is most commonly seen. Those, however, with a larger number of rows appear to shell a larger percentage and greater absolute weight of grain. The length of growing period is very variable in South Africa, varying from 125 to 160 days. Somewhat subject to rust. A good silage crop.

Yellow Leaming.—One of the earliest recognised varieties, originated by Mr. J. S. Leaming, of Ohio, in 1826, and subjected ever since to a careful system of selection. This extended period of breeding has strongly fixed the following characteristics, which are the most constant of any of the varieties of yellow corn, the majority of which have been evolved from the Leaming. The plant is inclined to be tall and slender; ears are long and tapering, ranging in length from 8 to 11 inches, circumference being 7 inches. From 16 to 24 closely-fitting rows of deep, reddish-yellow, wedge-shaped kernels with square cut tops and straight edges. Cob red and somewhat swelling at the butt. Percentage of grain to cob has a standard of 88 per cent. Medium early maturity with a growing period in South Africa of from 120 to 130 days. Has yielded well in many districts, and furnishes a good silage crop.

Golden Eagle.—Originated by Mr. H. B. Penz, of Illinois, in 1871. Has been cultivated for several years in various parts of South Africa, and especially in Rhodesia, where it is a general favourite. The plant is strong and a gross feeder, taking the place of Boone County as the best yellow variety for heavy and fertile soils. The ears are rather small with a standard length of 9 inches and circumference of 7 inches. They shell from 86 to 92 per cent. grain. Kernels somewhat loose on cob and of a bright yellow colour, deep and wedge-shaped, with a deep indentation. Cob small, red. Growing period in South Africa from 125 to 145 days.

Yellow Dent.—An American variety which has been cultivated in South Africa with contradictory results. It has a history of 50 years of selection, and the characters are consequently very constant. The plant is tall and slender, with rather small ears. The rows vary from 18 to 24 in number, and are closely packed. Kernels deep and wedge-shaped, with medium deep indentation. Colour a light, golden yellow, with occasionally reddish-yellow ears. Matures in South Africa in from 120 to 140 days. Suffers badly in certain localities from rust.

Funk's Ninety Day Yellow.—In America is one of the earliest varieties, maturing in from 90 to 110 days, according to season. Has

only recently been introduced into South Africa, but seed was widely distributed, and a growing period some ten days in excess of that stated above has been established. The plant and ears are relatively small, and, as might be expected, the yield of grain does not equal that of the more slowly maturing varieties. Ears somewhat tapering, with 14 to 20 rows of deep, wedge-shaped kernels. The latter are of a bright yellow colour, with a deeply indented, rough crown. Cob small. This variety should be useful for early and late planting.

Golden Ball.—Closely resembles Leaming, but originally showed a very early maturity. Grown for five years in Rhodesia, and originally ripened in less than 100 days. The period of growth has, however, been lengthening each year, and now varies between 110 and 140 days.

Early Yellow Mastodon.—A favourite early variety in the Transvaal. The plant is stout and leafy, and carries a large tapering ear, with a length of from 8 to 11 inches, and circumference of from 7 to 9 inches. From 14 to 20 rows of shallow, rounded, bright yellow kernels. Cob large. Growing period ranges between 105 and 125 days, according to season. Makes an excellent silage crop.

A number of other varieties have been recently introduced, but more extended trials are necessary before a verdict can be passed upon their relative merits. The term Horse Tooth has been applied to so large a group of varieties, including those showing early and late maturity, white and yellow grain, and other so widely diverging characters, that the name has lost all definitions, and cannot be employed in the present connection. It will be possible to add from time to time to the above brief list of such varieties grown in South Africa as possess certain fixed and stable characteristics enabling growers to study them in a systematic manner.

FLINT MAIZE.

The varieties falling under this type owe their specific characters to cultivation in the cooler climate of the eastern and northern United States. This environment has induced the evolution of a protecting, horny, seed coat, which completely envelopes the softer, starchy endosperm. As a consequence, the development of a deep kernel is prevented, and the grains are generally broad and shallow. This feature accounts for the early maturity of the plants, which ripen in from 80 to 95 days, their relatively small size, and absence of heavy foliage. The type is further distinguishable from the majority of dent varieties by the smaller number of rows in the ear, which are generally eight in number, and never exceed fourteen. As a whole, the yield of flint varieties in both grain and stover is considerably lower than that secured from those of the dent type, and wherever the common varieties of dent maize will ripen, flint maize is not usually desirable. It may, however, have its place in our colder districts and higher altitudes, when the grow-

ing season is necessarily a short one. Hitherto but little attention has been given to the type in South Africa, but the following may be mentioned as having given relatively good results to experimental cultivation:—Longfellow, Canada Yellow, North Dakota and Thoroughbred White Flint.

(To be Continued.)

Report of the Conservator of Forests.

JULY, 1904, TO JULY, 1906.

THE following is the introduction to and summary of the Conservator of Forests' Report for the above period. The full report is in the printer's hands and will shortly be obtainable on application:—

1. In accordance with instructions two brief interim reports have been submitted during the two-year period under review; these have been published in the *Agricultural Journal* for April, 1905, and January, 1906, respectively.

The office continues to control:—1, Forestry; 2, Fruit Culture; and 3, Certain Game Reserves, and is worked in direct communication with the Minister of Agriculture.

2. SUMMARY.

The work includes:—

1. FORESTRY:—

(a) The administration of the indigenous Crown Forests, worked from 25 Forest Stations by 2 District Forest Officers, 15 full-time Foresters, 10 part-time Foresters, and 9 Native Guards.

(b) The issue of additional regulations dealing with special cases as they have arisen.

(c) The demarcation of 18,979½ acres, making the total Forest now demarcated 64,884 acres.

(d) The afforestation at Cedara of 597 acres, making the area now under trees there 1,001 acres, and 100 acres partly prepared.

(e) Nursery work at Cedara, including 284,503 trees issued to the public and supplied to other stations or Departments, in addition to all required departmentally at Cedara, and 249,219 trees still on hand.

(f) The afforestation at Empangeni of 270 acres in more or less tropical kinds.

(g) The formation of 134 acres plantations for the supply of hut wattles to natives, and for the protection of indigenous forests. These are at seven Forest Stations.

(h) Investigation of Mallet Bark, and encouragement of Black Wattle Industry.

(i) The collection of Forest Revenue, £1,475 15s. 10s., in 1904-5, £2,252 11s. 6d. in 1905-6, besides trees and produce supplied to other

Departments, against book entries, £141 10s. 1d. in 1904-5, £202 0s. 1d. in 1905-6; total, £4,070 17s. 6d.

(j) The erection of 7½ miles of fences, making the total belonging to the Forest Department now 22½ miles.

(k) The construction of temporary Foresters quarters at all stations held by full-time Foresters not previously housed.

(l) The measurement of Sample Areas of indigenous forest in the best indigenous Reserved Forests.

(m) 271 prosecutions for forest offences, yielding about £394 4s. in fines.

(n) The leasing of 610 square miles in Amatongaland for the extraction of rubber.

(o) The publication of "Tree Planting in Natal."

(p) Advice given to all applicants *re* Forestal matters, including many articles in the *Agricultural Journal*; personal visits to many localities, public lectures, judging at shows, etc.

(q) Instruction given to students at Cedara in Forestry and allied subjects.

(r) Investigation of possible or probable minor forestal industries.

(s) Preparation of sample logs of Natal Grown Timbers, and formation of a Forest Herbarium.

2. FRUIT CULTURE:

(t) Planting and maintenance of experiment Orchards at Cedara, Weenen and Winkel Spruit.

(u) Public Lectures and much correspondence with fruit growers, advising in regard to kinds, treatment, packing, etc., or fruit, and making personal visits where necessary.

(v) Instruction given to students at Cedara in Fruit-culture, Horticulture, and Botany.

(w) Collection and despatch of local fruit to Royal Horticultural Society's Shows, London, reporting on same, and making experiments in cold storage of fruit.

(x) Many articles in *Agricultural Journal* on Fruit Culture.

3. GAME RESERVES:

(y) The maintenance and partial fencing of the Giant's Castle Game Reserve of 20,000 acres, and erection of a cottage thereon.

(z) The protection of eland and other game on Crown Land in Impendhle and Underberg Divisions.

Presentation to Conservator of Forests.

On Thursday (3rd inst.) afternoon Mr. T. R. Sim, Conservator of Forests, was presented by the staff of the Forest Department with a handsome silver salver, suitably inscribed, on the occasion of his leaving for England as Natal Representative to the South African Products Exhibition.

Richmond Agricultural Society.

THE following is taken from the Annual Report of the President, Mr. John Marwick:—

The mealie crop was considerably under that of previous seasons, although the acreage reaped was quite as large, due in a large measure to the continued dry spells during the season. Europeans reaped about 70 per cent. of what they did the previous season, and the natives not above 40 per cent. The failure of native crops was largely due to their having been cleaned in a half-hearted way, as the natives were in hopes of having ours to reap, and it would be a waste of energy on their part to hoe their own. By the time it had dawned on them they would have to, perhaps, fall back on their own, it was late, and the weeds had done the damage. The land they cultivate, or rather, I should say, plant, is getting pretty well worn out, and the time when they could shift to fresh ground when the old is getting weedy and worn out is past. The country is getting too thickly populated for that now, so that it will be only in exceptionally good seasons that they will in future grow sufficient to feed themselves, unless they fertilise the same as the Europeans do. I know two natives who purchase fertilisers, with the result that they have always some mealies to sell and sufficient to feed themselves. The natives have acquired a taste for luxuries, and their habit of carrying small lots of mealies to the nearest store to exchange for sugar, etc., will, except in very good seasons, make them purchasers of mealies for part of the season. I have known women take part of a bag that had been bought "on tick" from a farmer to a store to exchange for sugar, because the food would not go down without. The men pretend that it is done without their knowledge, but they share the sweets all the same, and cannot help knowing how they have been obtained. All the crops last season were below average, and particularly the late crop of potatoes.

Increasing areas are being planted annually for stock-feeding purposes, but with the late springs that we have had during recent years it is usually all finished before the rains come, and grass for the stock. Considerable damage has been caused to the crops now in the ground by the heavy rains we have had lately, and I notice that those farmers who cultivate their land properly have suffered most. The ground being loose and no live weed roots to help to hold it together, it washed away more readily until one commences to ask himself if it is advisable to keep the land quite free from weeds and well tilled. It undoubtedly does in dry seasons, but when rains like those we have had lately are the order it is doubtful.

The planting of *Paspalum* in this district appears to make very slow progress. The reason I am unable to give, unless it is that it seems to furnish an ideal breeding ground for ticks, and people are therefore shy of it. From what I can gather from those who have any quantity of it growing, and graze animals on *Paspalum*, in a tick country like this they will soon find it necessary to erect dipping tanks. If its cultivation

will induce farmers to erect dipping tanks it will be a blessing, apart from its merits as superior feed over the ordinary veld grasses, which are fast becoming principally ngongoni (wire grass). It was fortunate for the farmers that the native trouble in this district did not occur earlier. It happened at what might be termed a "slack time." The weeding was over and it was rather early to plant the late crop for feed purposes.

We are threatened with East Coast Fever, which unfortunately entered the Colony some time back. It is to be hoped that everybody will loyally co-operate with the Veterinary Department, when I feel sure it will not spread to any great extent, and we will be able to get rid of it in time. Otherwise, if we hamper the Department and put obstacles in the way, as I am sorry to notice several seem inclined to do, we are going to make it endemic. Loyally co-operating with the vets. probably will be inconvenient at times, I admit, but everybody should bear his share and not try to shuffle out when the shoe pinches. I regret that at recent public meetings it was decided not to have this district placed in quarantine. This district was visited by swarms of locusts some time back, which laid their eggs over a large portion of the district. The hoppers are now causing considerable trouble and expense. Farmers are energetically poisoning them, but the unoccupied farms are harbouring large swarms. No one is doing anything to kill them. Those who are unfortunate in joining unoccupied farms, having rid themselves of the locusts, will have these swarms coming over the boundary and be compelled in self defence to attend to them too. Owners of unoccupied farms should be made to kill the locusts and not be allowed to put it off till the hoppers are big enough to travel to adjoining lands, thereby having the job done "on the cheap."

During last year the Society came to an arrangement for the erection of a building for storage purposes in the corner of the show yard abutting railway siding, which has been completed. The new building has been taken full advantage of in the way of storage. Debentures for the erection of the building were taken up chiefly by those who are large producers and interested in providing storage close to rails, which enables them to give prompt delivery and take advantage of the market.

I regret to have to record the death of one of the Society's foundation members, in the person of the late Mr. Peter Flett. His removal leaves a blank in the Society and the district, another of the old landmarks gone. He, as you all are aware, was a relative of mine, so it would be out of place for me to say anything further in this connection. Owing to the Show having been abandoned there were not so many committee meetings held as usual during the year. In conclusion, gentlemen, I wish to thank the Committee for its support, especially the Hon. Secretary and Hon. Treasurer, for their untiring efforts on behalf of the Society; also Mr. A. W. Cooper for time and trouble taken in getting through the debentures *re* storage building. I beg to thank the members for having elected me as President, and express the wish that some one else be now promoted to the office. The post of President is the "blue ribbon" of the Society and should move round the members. Its doing so will be an advantage to the Society, as when one man is kept long in an office things are sure to get into grooves.

Experiment Farms.

CEDARA.

REPORT for the four months ending 31st December, 1906, from Farm Manager, Central Experiment Farm, Cedara, to Director of Experimental Stations:—

I have the honour to submit the following report of the work done, and progress made on this branch of the Farm, for a period of four months ending 31st December:—

From the beginning of September until the date on which you arrived here to assume office, viz., 15th October, attention was being devoted to the carrying out of Mr. Pearson's final experiment instructions for 1905-6. Previous experience has borne out that unless our detailed instructions are issued early in the season (about September) the work becomes immediately in arrears; and, as every farmer knows too well, when once this is so, it is difficult to bring into line again. In view of your appointment having been effected so late in the season, obviously by the time your instructions were ready the season was well advanced. It will, therefore, I am sure, be reasonably admitted that all concerned have been heavily handicapped under such circumstances. Within a few days of your arrival instructions were received, and the work was put in hand as soon as it was practically convenient.

At the outset it was decided that various maize experiments should be conducted on a more extensive scale than had formerly been done; and the ground selected for the purpose, being beyond the boundary originally allocated for experiments, had of necessity to be surveyed and plotted off. At date of writing there are approximately 100 acres under experimental crops, all of which require constant attention in the way of surface cultivation, weeding, etc., while at the same time other crops are in process of planting. On the whole the work has been got fairly well in hand, and I take this opportunity of recording my appreciation of the earnest attention and desire the Field Experimenter, staff and students alike, have shown to have the work efficiently done and carried through with the minimum of delay.

The rainfall for the period under review has certainly been most satisfactory, and has shown an increase of 8.92 inches on the corresponding period of last year:—

	Inches.
September	3.89
October	4.16
November	6.71
December	3.71
Total	18.47

On several occasions heavy rainfalls, causing damage by wash around buildings and along roads, have been experienced, but surface drains to the extent of 3,500 yards are now cut; this will prevent any further damage in this connection for some time. There has also been some extensive draining done on the vleis land, which is to be used for experimental plots; and, in addition, experiments are being carried out in subsoiling, partly with a view to reducing wash. The benefit from subsoiling for this purpose has already been very marked, though I will report more fully on this later on in the season. The temperature has been comparatively uniform throughout, the maximum record being 95° F., while the minimum was 32° F., registered on the vleis in September. We have fortunately escaped hailstorms so far, but hot, north winds have been prevalent of late.

On the 25th September potatoes were planted on the Manure and Distance of Planting sections, in all comprising 76 plots, the variety being Up-to-date; marked results from the various treatments were in evidence on the foliage, particularly so in the case of phosphate manuring, and I have no doubt the results when harvested will be interesting and educative.

Algerian and Indian oats were planted on 40 different plots on the 27th September. The former variety has made a splendid growth, and promises so far to be the best crop of forage yet grown on the Farm; it will not be in condition for harvesting for some time, while the Indian variety, which was planted on the same date, is now being harvested. It appears to produce a fair body of grain, but a scanty return of straw.

Tabulated results of the actual yields will be furnished at a later date.

Two varieties of rye, viz., Rye of the Abruzzes and Rye of Naples, were planted on the 1st October. The former variety will be ripe in about a fortnight, and is one that gives every promise of being worthy of a more extended trial, as it gives every indication at present of yielding a good sample of grain providing the weather will be favourable for filling and maturing; the latter variety is not yet in ear. Eight plots of millet (*Fruentaceum giganteum*) planted on the 28th September are showing vigorous growth on the manured plots.

On the Variety Plots, peas, beans, pumpkins and marrow were planted on the 1st October, and 130 varieties of potatoes on the 17th inst.

In the kitchen garden, which has recently been considerably extended, potatoes, cabbage, cauliflower, artichokes, asparagus, rhubarb, peas, beans, leeks, tomatoes, marrow, melons, celery, lettuce, etc., are being grown.

Between the 12th and 24th November five acres of potatoes were planted, the experiments being based upon—

(a) Ploughing, subsoiling and surface cultivation.

- (b) Chemical manuring.
- (c) Insecticide (Vaporite).
- (d) Kraal manuring.
- (e) Spraying.

An area of 29 acres was planted with mealies on the 26th November for experiments on Distance of Planting, the effect of subsoiling, and the introduction of a bean catch crop on surface wash. The varieties used were North American, Boone County and Improved Horse Tooth, planted in alternate rows, with the object of cross-breeding for selection variety. This section has been surface cultivated twice with the anti-clog weeder.

Between the 4th and 12th of December 29 acres were planted with mealies for manure experiments (chemical and kraal), the varieties being Early Leaming, Funk's Yellow Dent, and 90 Day Yellow; also in alternate rows with a view to cross-breeding and for selection varieties. This section has been cultivated twice with the anti-clog weeder.

On the 19th December an area of 14 acres was planted with mealies, variety Early Mastadon, in conjunction with a series of catch crops to be experimented upon at different dates during the season. This section has been surface cultivated once. A fractional part of the work has, therefore, only been done on this portion.

A Cultivation Section, having an area of 11 acres, was planted with mealies (Early Mastadon) on the 24th December, a date beyond which it is needless to plant mealies with a view to obtaining grain, as the crop is then invariably destroyed by frost.

Twenty-five acres of mabele, planted on the 23rd October, have proved a failure, consequently this area will be available for winter crops.

It is to be regretted that the mangold crop could not be attended to an earlier date, but the ground has now been ploughed, subsoiled and manured, and planting will be done in the course of a few days, and, if favoured towards the latter end of the season with a continuance of the weather now prevailing, a satisfactory crop may yet be grown.

The working stock are at present in a healthy condition; the numbers on charge at date are 9 horses (draught and riding), 6 mules and 38 oxen. The Militia Department has very kindly allowed us the use of a few horses for a short period. They will be very useful for light field work, also to the students for riding, as hitherto there have not been the facilities for that purpose to the extent that I should have liked. I would point out that it is necessary to increase our number of work oxen, as I consider they are being overworked. The casualties for the period under review have been—

1 Horse, died of inflammation of the kidneys.

1 Horse, died of Biliary Fever.

1 Mule, having a deformed hoof, was handed over to the Bacteriological Department.

1 Ox. died of tumour on the brain.

A great acquisition to the Farm has been the securing of a flock of 42 Persian sheep from Cape Colony, 30 being pure bred. These arrived on the 10th December; their average live weight, taken on the 29th instant., was 63lbs. The majority is lambs and the rest two to four-tooth.

The construction of a dam for the water supply of the Farm has been completed and the necessary piping laid, as also the carrying of the system into the School of Agriculture, laboratory, kitchen, bath-rooms and dairy. The water has also been laid on to six paddocks, thus rendering them of more service than has previously been the case. The blacksmith's time has been mainly occupied on this work, as also in attending to the minor details of the ordinary blacksmithing work of the Farm. He further attends to the shoeing of horses and mules, and working the steam engine when necessary.

Owing to the large amount of carpentry work of an urgent nature to be done, it was found necessary to employ an assistant carpenter for a few weeks. The principal work done has been, pulling down the original implement, seed and manure store on the vlel (wood and iron) and utilising the material for the construction of a laundry for the use of the School of Agriculture and a boiler house for the dairy branch. Fittings were made for the bedrooms, kitchen and laboratory in the School of Agriculture, also a large number of boxes necessary for the sprouting of potatoes, and sheep shelters have been erected. Certain carpentry work at the Winkle Spruit Experimental Station has been attended to by the farm carpenter. Attention has also been given when necessary to the repairs of implements, etc. Both carpenter and blacksmith devote special attention in their respective branches to the tuition of students.

There are now 14 students on the Farm; they have become familiar with the routine of work, and do the actual manual labour, and receive tuition in the field and workshops. I have very much pleasure in reporting on the general satisfactory progress that is being made by them, and on their good conduct.

The public interest which is being taken in the Farm is reflected by the increasing number of visitors and letters of enquiry.

ALEXANDER REID,

Farm Manager.

THE COLLEGE.

Report for the period ending 31st December, 1906, from House Master, School of Agriculture, Cedara, to Director of Experimental Stations.

On February 12th I took up my appointment here as House Master, and on April 19th the school was opened. We made a small beginning with three students, but since then we have increased steadily

till we now have 14, and I have every reason to hope that we shall have quite 20 by the time the next session begins in January. Portions of two days during the week have been set apart for lectures and demonstrations, with occasional evening lectures. The rest of the time is devoted to practical work in the field and shops. The year is divided into two sessions, from August 1st to December 15th, and from January 15th to June 30th. During the remaining two months there are no lectures or demonstrations; and the students are allowed a fortnight's holiday twice a year; but only half are allowed away at a time, in order that there may be always some here to help with the work of the farm.

A tennis court has been made, and other games will probably follow. There is no fixed time for recreation, but the boys are allowed time off for this according as the work of the farm allows. There is also a Rifle Association on the Farm, of which all the boys are members. A disused open reservoir is now being converted into a swimming bath.

An Anglican and a Presbyterian clergyman each visit the farm once a month and hold services in the school, and on the other Sundays I read the service myself.

The health of the boys has been excellent, and their work and conduct satisfactory.

The lectures and demonstrations are attended by all the boys. Owing to the Native Rebellion and the outbreak of E.C. Fever, a start was not made with the Veterinary Lectures until the end of October; moreover, very few lectures have as yet been given on general agriculture owing to the late Director's resignation and your own recent arrival. Appended is a statement of the lectures and demonstrations attended during the period under review.

For the practical work the students are divided into five groups, and spend a month at a time at each subject:—

1. *Field Work*.—Ploughing, cultivation and preparation and application of manures, seeding, harvesting, etc., in season, and is under the supervision of the Farm Manager and Field Experimenter.

2. *Dairy Work*.—Feeding and management of dairy stock, milking and separating, butter making, etc., and is under the supervision of the Assistant Dairy Expert.

3. *Orchard Work*.—Raising nursery stock, planting, grafting, budding, pruning, etc., and is under the supervision of the Orchardist.

4. *Carpentry*.—In addition to the ordinary shop work, this includes erection of wood and iron buildings, fencing, etc.

5. *Blacksmithing*.—Setting up, handling and repairing of farm implements, farriery, water-fitting and general shop work.

Instruction is given in the last two subjects by the Carpenter and Engineer respectively, under the supervision of the Farm Manager.

(Signed) C. W. HANNAH, M.A.,
House Master.

CURRICULUM.

(April to December, 1906.)

*Lecturer.**Demonstrator.***FORESTRY.**

Conservator of Forests (once a month) . . Forest Officer (once a month).

FRUIT CULTURE.

Conservator of Forests (once a month) . . Orchardist (once a month, and special demonstrations in season).

BOTANY.

Cons. Forests and Forester (once a month) . . Forester (once a month).

HORTICULTURE.

Cons. Forests and Forester (once a month) . . Forester (once a month).

AGRICULTURAL CHEMISTRY.

Analyst (twice a week) Analyst (twice a week).

VETERINARY PRACTICE.

A. Goule, M.R.C.V.S. (fortnightly) . . A. Goule, M.R.C.V.S. (fortnightly).

DAIRY WORK

Dairy Expert Assistant Dairy Expert.

MENSURATION.

House Master (fortnightly) House Master.

During the coming session there will be a more complete system of lectures and demonstrations, comprising, in addition to the above, Principles of Agriculture, Breeding and Management of Stock, Poultry Farming, etc., Entomology and the Destruction of Pests, Farm Surveying and Bookkeeping. A detailed syllabus is now in the course of preparation and will be submitted at an early date.

WEENEN.

Quarterly Report for period ending 31st December, 1906, from Curator, Weenen Experimental Station, to Director of Experimental Stations.

Owing to your recent arrival the work for the present season has been rather rushed. In spite of this, however, the planting operations, as per instructions received from you, are well in hand, and I trust they will all be completed in time.

The grading operations on lower end of station will probably be well in hand by the end of January, so that the crop of winter wheat may be planted. This work should be very useful in demonstrating in a practical manner to the settlers how land should be prepared for handling irrigation waters in the most economical manner.

A very valuable demonstration as to the amount of forage that can be grown on one of the poorest pieces of land in this settlement has lately been shown on this Station. The piece of land selected for

growing the crop was 5 acres in extent, on the upper portion of the block. The ground was seeded on 23rd April, 1906, and cut on 22nd October, 1906, and five following days. 85lbs. of good Algerian seed was sown to the acre, and as the ground was perfectly dry irrigation had to be resorted to to germinate the seed, and, as practically no rain fell during growing period, the crop was subsequently irrigated five times. 211lbs. Ordinary Superphosphate per acre was applied, and the yield per acre was $2\frac{1}{4}$ tons of dry forage. Considering the splendid stand of crop this is a light yield. I consider that this would have been quite three tons but for the fact that the crop was badly damaged by hail prior to cutting, and the greater portion of the forage dried out too much in the field owing to failure of labour at a critical time.

The tobacco seedlings of five different varieties have made good progress, and will shortly be ready for setting out in the field vacated by the forage. This field has been ploughed up and is in splendid tilth for planting.

The plot of ground intended for drainage tests is being prepared for planting, and will be seeded as soon as possible.

The plot of King Edward VII. potatoes for testing manures and different sizes of sets has been planted, and the crop is just appearing above ground. A series of plots of local Early Rose potatoes to test manures of different kinds, planted earlier in the season, have made good growth, and will be ready to dig in three or four weeks' time. The 19 plots of lucerne planted last March and originally employed for Quantity of Water tests, have now been changed into a combined Manure and Cultivation testing field. The manures have not yet been applied, but the cultivation tests (surface cultivation between the rows) has been in operation for some little time, and already results are noticeable. The lucerne during the present season has suffered from the ravages of caterpillars. I think it probable that this pest will disappear shortly, and may not be seen again for several years.

It is proposed to plant the area of 6 acres between the tobacco field and main road with different varieties of millet, and then, with the completion of the planting of the tobacco field, the sowing of all varieties which I am putting on Row C, and the drainage tests, Row F, the block will be fairly filled up, with the exception of Row E, and the portions to be graded and sown with winter wheat.

Mr. J. K. Harding's tender for the construction of proposed flue-curing tobacco barn has been forwarded to you, also some suggestions from Mr. Owen Walters of this settlement in regard to construction of same.

The buildings, stock and implements are in good order and condition, and a number of ornamental trees have been planted about the former, which will, in a year or two, improve the appearance of the place to a considerable extent.

F. McPHERSON, Curator.

WINKEL SPRUIT.

Quarterly Report for period ending 31st December, 1906, from Curator, Winkel Spruit Experimental Farm, to Director of Experimental Stations.

Work on this Farm during the past three months has practically been confined to the clearing of bush land in order to fully carry out your maize and paddock feeding experiments. This extra work has somewhat retarded planting operations, which are now in full swing. Land for a coffee plantation has also been partly cleared, and this work will be resumed when labour is available.

Dealing with the planting as it has been carried out, the first to receive attention were the aloes. Two thousand plants of *Furcraea Gigantea* and one hundred and sixty of *Agave Sisalana* were planted, most of which are now making fair headway. Sugar cane as breakwinds was also planted around the cotton and fibre sections to prevent the shifting of the soil, which is of a loose, sandy nature. The position of these sections is very high, and they are consequently greatly exposed to the wind from all quarters.

Tobacco planting was then proceeded with, and this, I am sorry to state, has proved a failure owing to the continuous strong winds prevalent on the Coast at this time of the year. Out of 10,000 plants transplanted only about 10 per cent. survived. This destruction could be prevented in future seasons by very early or late planting, or by the early planting of maize as breakwinds, meteorological returns tending to prove that the months of November, December and January are more subject to strong winds and storms than the two preceding and two following months.

The old Arrowroot (Distance of Planting) Section previously set aside for Havana tobacco has been planted with Boone County maize, which is growing well.

Kraal and chemical manures have been spread and ploughed under on the Potato Section and the seed planted, the work being completed on December 15th. On the same date from 8 to 9.45 p.m. 2.58 inches of rain fell, causing washouts all over the Farm, and resulted in the complete disappearance of the potatoes planted, only three sacks being eventually recovered from the cane, bush and silt, which were replanted.

No. 1 pig paddock has been planted with pea nuts, and sections formerly planted with Dar-es-Salem cotton, lucerne, pea nuts, peas, kidney beans, soy beans and cow peas have all been turned into one section and planted with Boone County maize.

The rainfall for the past six months has been heavy, over 21 inches being recorded. Only .28 points of this fell in July and August, the balance of 21 inches falling during the latter four months. Weeds are growing profusely, and with my limited supply of labour it is almost impossible to cope with them. Since writing the above, this place was

visited with another storm, over 1 inch falling in about an hour. This has washed out the mealies freshly planted on the old cow pea section, besides again washing out the potatoes.

The stock are all in splendid condition, and labour supply plentiful.

W. JOHANSEN,
Manager.

East Coast Fever.

EXPERIENCE OF RHODESIA.

THE following is a letter from the Chief Veterinary Surgeon, Rhodesia, Mr. J. M. Sinclair, F.R.C.V.S., to the Principal Veterinary Surgeon of Natal, Mr. S. B. Woollatt, F.R.C.V.S.:—

Sir,—In reply to your letter of the 18th instant *re* Coast Fever.

When the disease first appeared in Rhodesia I was away at Kimberley on Rinderpest work; afterwards I went Home on long leave, so that I was not in touch with its very rapid spread over a large portion of this territory, and I can only speak with any confidence on its progress since August, 1904, when I came here to act for Mr. Gray when he went on leave, succeeding him in March, 1905, when he went to the Transvaal.

The approximate mortality to date is as follows:—

Year ending 31st March, 1902	12,761
Year ending 31st March, 1903	16,270
Year ending 31st March, 1904	3,530
Year ending 31st March, 1905	361
Year ending 31st March, 1906	732
1st April to 31st October, 1906	191
Total	33,845

The number given for year ending March, 1905, represents a period of eight months only; the records for the other four are not available.

I attach schedule showing monthly mortality since September, 1904.

I do not think that anyone will deny that the rapid spread of the disease during the years 1902-03 was due chiefly to transport oxen. The disease went right through the country by the main transport road, Umtali to Salisbury, Salisbury to Bulawayo, and from this trunk line to various centres on either side. The greatest losses occurred amongst transport oxen and on farms adjoining infected roads and the large infected centres of distribution, viz., Umtali, Salisbury, Gwelo and Bulawayo.

It will be seen from the table above given that the disease showed a marked decline during the year 1904, due, in my opinion, to the fact that most of the transport oxen had succumbed. In fact, at this time there were practically none but salted cattle on the infected roads. The disease was, however, lingering and spreading slowly in the various infected districts; these will be seen on the attached schedule. Towards the end of 1904 general regulations were promulgated prohibiting as far as possible all movement of cattle. Practically no movement was allowed except for slaughter purposes, and for mining purposes within a radius of 10 miles of mines. In the eastern part of Mashonaland we had to allow a limited amount of transport for supplies to places difficult of access, such as Melsetter and Inyanga. Although the disease was not spreading to any great extent at the time these regulations were promulgated, I am certain they have been very largely responsible for preventing the spread of infection to clean areas during the last two years. As a matter of fact, during this period we have not had more than half-a-dozen outbreaks on previously clean veld.

After these regulations had been in force for some time it was found that infection was being kept alive by calves, and provision was made for the enclosure of all calves on infected farms and other centres, such as commonages. This proved of the greatest benefit, and during the last two years large numbers of calves have been reared in Umtali and Salisbury by dairy men. When these were weaned they were removed by wagon to clean veld, with the result that the Salisbury and Umtali Commonages are now perfectly clean. Various farms have been cleansed by the same method. Of course, on these infected centres all the adult cattle were salted, and no raw cattle were allowed to be brought to them until at least twelve months from the last case of disease. The adoption of this system has resulted in the eradication of the disease in many centres where infection had been lingering for two and three years.

Your information that in certain districts all the cattle died except those belonging to farmers who were able to fence is correct to a very limited extent. When I tell you that to-day there are not ten farms in Rhodesia entirely fenced you will understand that the number of cattle saved by this means cannot be very large. The best object lesson we had as to the beneficial results of fencing was at the Springs farm, Bulawayo. The owner, Col. Napier, fenced early, and although the disease broke out all around him he never lost a single beast from Coast Fever. A few others were able to save their cattle by fencing, notably, the Matabele Reefs and Estates Coy. and the Central Estates Coy., both very large cattle-owners. Had fencing been generally resorted to as a preventive measure in the early days of the disease, I am positive that scores of farmers who suffered very heavily would never have lost a beast.

Possibly some reference may be intended to two areas fenced in Matabeleland for the purpose of dealing with infected cattle. At Mzingwane native cattle had been dying at various kraals for upwards of two years. We fenced in about ten thousand acres of clean veld, several miles away from the infected area, and removed all the cattle from the infected area to the fenced-in area. The system first practised by you was adopted in the removal of these cattle, and since their removal not a single case of Coast Fever has occurred amongst them. The second fence was erected at the Fingoe Location. For various reasons it was impossible to remove these cattle to clean veld, so we fenced in the whole of the infected area. The disease gradually died out, assisted by moving the cattle from place to place within the area, and it is now more than eighteen months since a death from Coast Fever has occurred at this centre. In this case our object in fencing was not to save the Fingoe cattle, but to prevent the disease spreading to adjacent herds, and we accomplished our object.

We have satisfactorily dealt with various lots of infected cattle by removing them to clean veld without fencing, every care being taken to prevent cattle getting on to the infected area until we are satisfied that it is clean, and we hope by dealing with any fresh outbreak on these lines to eventually eradicate the disease from the whole territory. You will understand that we have excellent facilities for carrying out a measure like this. I refer to the large clean areas we have on which there are at present very few cattle.

With regard to dipping. When the disease was spreading through this country tanks were erected at various centres along the transport routes, but most of these have been lying idle since the movement of cattle was prohibited. At Umtali, Salisbury and Bulawayo the tanks have been kept going for the purpose of dipping commonage and slaughter cattle. Few farmers have been able to erect tanks. A few did when the disease appeared amongst their cattle, but I do not think the fortnightly immersion practised resulted in any appreciable diminution of the ultimate mortality. Dipping would undoubtedly prove a most excellent preventive measure if universally practised in any district or province, but when once the disease appears there is, in my opinion, only one thing to do, viz., remove the cattle to clean veld.

I shall be very pleased to give you any further information in my power.—Yours faithfully,

J. M. SINCLAIR.

Salisbury, 26th November, 1906.

It is not generally known that anyone attending to bees may escape many stings by first thoroughly washing their hands, then rubbing them all over with a little pure beeswax. This prevents any odour from the hands being noticed by the bees. The scent from beeswax attracts a bee's attention very strongly, and seems to deprive it of any exhibition of hostility or bad temper.

Marvellous Poultry.

THE following is extracted from a Chicago newspaper:—

Elkton, Md., Oct. 20.—In a poultry yard near here is a hen that is considered to be a freak. She can play the piano.

It all happened when the hen flew into the parlour of the farmhouse and landed on the ivory keys of the instrument which, of course, gave forth a few discordant notes. At first the chicken was greatly astonished, but in a little while she grew accustomed to the sounds and liked the effect.

It then became a common thing for the hen to perch on the window while the daughter of the house was taking her lessons and intently listen to the music. By and by the fowl tried a few notes herself, and finally, to the surprise of all, she ran the scale.

That settled it. The hen, called Bache, started out on an artistic career, and to say that she has succeeded puts it mildly. She is really wonderful.

In the heavier compositions she is a failure, but in the lighter works, and especially in sprightly airs, she surpasses. Her range, of course, must be limited by the width of her claws, but even this handicap is partly overcome by the clever use of her wings in jumping from one octave to another.

Wildwood, N. J., Oct. 20.—It is a pity the lightning bug season is at an end, for sceptical persons will not be able to verify the truth of John Shaeffer's statement that by feeding hens lightning bugs you can induce them to lay illuminated eggs.

Mr. Shaeffer, during the height of the lightning bug season, gave two hens nothing else to eat, and he declares that each day he got two eggs of sixteen-candle-power strength.

By varnishing the eggs he has preserved their strength, and he believes the longer these glowing eggs are kept the stronger they will grow.

By painting them red, blue or green he found that he could get as many different coloured lights, and most beautiful effects could be got by stringing them in festoons.

He thinks that if lightning bugs are fed to ostriches lights large enough for automobile lamps can be had.

Fullerton, Mo., Oct. 20.—The craziest rooster in all Missouri is owned by Walter Lynne, residing near here. It is acting as if it were an automobile and is creating havoc among the flock.

This rooster no longer crows at dawn, but by assiduous association with a few geese it has acquired a lovely "honk, honk," and practices this on all occasions.

At times it starts at one end of the barn-yard and, giving a warning alarm, rushes through the rest of the chickens, bowling them over right and left.

A few days ago Mrs. Lynne left a can of kerosene on the back porch, and within ten minutes the rooster was doing its best to drink up the stuff, undoubtedly with the object of acquiring the gasoline smell.

It is also developing an "auto face."

Salem, Va., Oct. 20.—Much sympathy is expressed for Aunt Mary Fitzpatrick, whose entire flock of chickens has been tampered with by some unfeeling wretch to the end that they are laying poached eggs.

It is almost certain that for months the chickens have been fed on cayenne pepper and tabasco sauce, which sizzles the internal department of the chickens.

So great is this heat that the feathers on the fowls are quite scorched at the ends and the skin appears parboiled.

As this flock was almost the sole support of Mrs. Fitzpatrick, kind neighbours have been buying the eggs from her. But even a steady diet of this sort palls in time, and the inhabitants are praying for cold weather, when it is thought the temperature of the hens will be reduced.

A Cattle Show of Old.

It was, says the *Globe*, London, in one of its "turnover" articles, on the morning of the memorable 13th of May, 1827, that Mr. Pickwick, taking a comprehensive view of the locality from his bedroom window, found "Goswell-street at his feet, Goswell-street on his right hand, Goswell-street extending on his left, and the opposite side of Goswell-street over the way." We are not told whether this extensive panorama included the premises honourably known as "Sadler's Yard, Goswell-street"; but here, a hundred years ago, was held the show of the Smithfield Club. That this was on a much humbler scale than that which has long been a popular event both for town and country is necessarily implied by the site selected. But the limited character of the show is brought home to us more fully by the fact that the proprietor of Sadler's Yard paid 50 guineas to the club, for which modest sum he was to provision all the animals exhibited, and to receive in turn all the money paid for admission. It is not, however, in mere point of extent that the shows divided by a hundred years are so strikingly different. It was in 1806 that the first dahlia was exhibited in England, and the variations between that single-rayed flower and the present pompous representatives of the family are hardly greater than those shown by British cattle in the same period. At the beginning of the last century old views and old methods of breeding, rearing, and feeding still widely prevailed. The farmers of the West of England loved "a snug tight bullock, with a stout frame of bone to build flesh and fat upon, and a good thick hide to keep out the cold and wet"; but the main consideration was that such animals "cost little or nothing in keep." With the result, that some of our beef was often fairly describable as "black and coarse-grained as horse-flesh."

All cattle shows are presumably held to demonstrate the force of the proposition that the proof of the ox is in the eating; and from this point of view the "lead" long given by the Smithfield Club has worked wonders. There is beef—and beef in our own day; but the difference

between the English beef of even a century ago and the pick of our present markets would certainly astonish the valiant diners at either end of that historic vista. Too many of the cattle of the former period were leggy, throaty, large-boned, and coarse, though the "square, beefy Dutchman" had already been imported to become the basis of our future shorthorns. But it was not until 1803 that such an advance was shown in this breed as to warrant the Club in awarding a prize to the "best shorthorn"; a class which, to-day, is perhaps the most numerous and popular in the kingdom. Even the names of most of the old breeds once in vogue are now forgotten; but their defects were so palpable that they might have been—as some doubtless were—the lineal descendants of the animals of the Middle Ages. The old Lincolnshire cattle were coarse, and "stilty," while the Glamorganshires were what was then known as "cloddy." The Holderness breed were perhaps the worst-shaped cattle in this island; "long, gaunt, deep carcasses, without adequate substance; standing upon high stilts of the coarsest timber; slow feeders, never fat, and the flesh excessively coarse." Even the once favoured Pembroke ox was too leggy, but he matured early, and inherited the then especially valuable quality of being able to "stand his drift." By which West-country phrase was meant the ability to make long journeys without too much exhaustion, a point in the old economy of cattle raising—and especially of cattle "showing"—which no one concerned in the industry could afford to disregard. For a herd had often to travel scores and, occasionally, hundreds of miles, so that "constitution" was an essential factor in the animals upon which the country then depended for its roast beef. Scott speaks of the cattle which the Highland drovers used to conduct from far Lochabar to Lincolnshire, a feat which perhaps only those chiefs among herdsmen could have accomplished. It was to this necessity of travel that the old complaint of "legginess" was perhaps mainly due; the breeder not feeling free to cultivate size and shapeliness, without reference to the strength of leg and bodily constitution necessary in an animal in which these qualities were so often tested.

But most differences tend ultimately towards compromise. If our ancient beeves had to "stand their drift," we are yet assured that a not too fatiguing journey improved the quality of their meat. The reason given is, that a fair amount of travel on foot causes the fat to incorporate more intimately with the lean, and the muscle itself to become more tender. "Such meat acquired a softer, marrow-like consistency, and was doubtless more digestible than the robust, hard fibred flesh which reaches town, without the slightest exertion, by rail." This may be looked at either as a counsel of perfection, or as a carping criticism, according to the point of view. Of course, an immense advance in the character of our cattle had been made even before the inauguration of railways; but it has also been going on ever since; and a stalled ox of even half-a-century ago would probably make a poor appearance by the side of one of our latest prize-winners. The latter may sometimes strike us as unwieldy, and perhaps overfed, while their vast bulk is not without a touch of the pathetic. And, of course, they are groomed and attended as becomes their dignity, and the weighty issues depending. In a word, they have been sedulously brought to that high state and condition which is commonly spoken of the "pink

of perfection." As compared with such an exhibition as this, the cattle gatherings of old—whether at show, fair, or market—must have presented a meagre and bedraggled appearance. But like its modern counterpart, the old show necessarily represented the conditions of country and agricultural life which then obtained. And this practically means the before, and after, of the railway system. The one signified the drover, and the drover's dog, and vast herds of weary, hoof-sore cattle, limping painfully onward from one centre to another. The other involves more complex considerations; but on the whole, the philosopher at the cattle show may contemplate with satisfaction the great strides already made in the interminable march of improvement; and dismiss without regret the good old times when any such gathering was always a rough, and sometimes a painful, exhibition.

Co-Operation.

EXTRACT FROM MR. CHAMBERLAIN'S TARIFF COMMISSION,
VOLUME 3, REPORT OF THE AGRICULTURAL COMMITTEE.

THE evidence received in regard to co-operation and market organisation indicates how little has been done in the way of serious and systematic co-operative organisation in Great Britain, though in Ireland, as shown in the evidence of the Secretary of the Irish Agricultural Organisation Society, the process has been marked. It would seem that, where agricultural co-operation has been a success in Great Britain, it has been chiefly in the purchase of farmers' supplies, and witnesses from Wiltshire, Somerset, Leicestershire, Cheshire, Staffordshire, Lancashire and other countries suggest the large field there is for its existence. In Worcestershire and Staffordshire witnesses say they gain 10 per cent. to 15 per cent. by the co-operative buying of their implements, seeds, manures and feeding stuffs, and the benefits arising from the operations of the West Norfolk Manure Co. are specially referred to in the evidence from the Eastern counties. Reference is also made in the evidence to other co-operative and farmers' supply associations which enable farmers to obtain manures, feeding stuffs and implements on more advantageous terms than would otherwise be secured, but outside Ireland there is little evidence of the systematic adoption of co-operative principles as understood in countries which are our chief competitors in agricultural produce.

The evidence of the Irish Agricultural Organisation Society shows that in co-operative creameries there is a membership of nearly 100,000 people, mostly heads of families, so that half a million of persons in Ireland may be said to be directly interested in this branch of co-operation alone. So indispensable is co-operation deemed by this Society (which itself has been so largely instrumental in promoting the co-

operative movement in Ireland on its present lines) that the Secretary states it as his opinion that without it the Land Purchase Act cannot be permanently successful. He says:—"It is very little use for the State to put people in possession of the land and to change their annual rental to an annuity, even if that annuity is considerably less than the amount of the rent which they used to pay, unless they at the same time place these people in a position to buy the raw materials for the industry at bedrock prices and to sell their produce to the greatest advantage. If that is not done, the mere creation of a peasant proprietary among these small men may prove to be something else than an unmixed blessing. Without co-operation among these small men the peasant proprietor in a few years will be in as bad a plight as when he was a tenant farmer." Creamery dairying is on the increase in Ireland, as it pays better than the ordinary system of dairying on non-co-operative lines under which each farmer makes his own butter and has to find a market for it. The approximate value of the annual output of the co-operative creameries in connection with the Irish Agricultural Organisation Society is stated to amount already to between £1,500,000 and £2,000,000. "We are now," observes the Secretary of the Association, "gradually coming to the point where we can apply co-operative methods to practically every branch of the agricultural industry, and with great success in particular to the marketing for agricultural produce. We have solved the problem in butter, we are solving it in eggs, but when you come to deal with grain, for instance, the sale of barley to either malsters, the brewers, or distillers, you find that a very difficult matter." The evidence shows the improvement in the quality of the butter which has resulted from the action of the creameries, to which the farmer simply delivers the fresh milk, taking away the separated. "Nor are the advantages confined to quality only, for whereas under the old system 3 gallons of average milk yielded 1lb. of butter, now the average is 1lb. of butter from 2 1-3rd gallons. The butter is made and sold at the creameries at a cost of about 7s. a cwt. Creameries have been established either in connection with the Irish Agricultural Organisation Society or independently, in all parts of Ireland, as shown by the reports of witnesses in Cork, Tipperary, Kilkenny, Donegal, Antrim, Londonderry, etc. Agricultural co-operation in general has been more extensively adopted in the South of Ireland than in the North.

But though systematic co-operation for the sale of produce, as well as the purchase of farmers' requisites, has been so little adopted in the United Kingdom outside Ireland, the evidence shows how many districts there are in the various parts of the country in which farmers realise the need of the adoption of methods which are proving so successful in Ireland and other agricultural countries. One difficulty which is again mentioned in the evidence as standing in the way of the extension of co-operative buying is the want of ready money on the part of the farmers. A Wiltshire witness says:—"We carried on for 15 years a co-operative business, turning over from £30,000 to £40,000 a year, but, owing to farmers being so short of money, it fell through," and similar evidence is given by other witnesses. Other evidence as to the failure of co-operation may be classified under three heads:—(1) Bare statements of the fact that co-operation in a certain district has been tried and had failed.

This evidence comes from districts as far apart as Lincolnshire, Northamptonshire, Londonderry, Galway and Lanark. (2) The evidence of witnesses which lay the blame of failure on bad management. (3) The evidence, also from widely separated districts, of witnesses who attribute failure to the difficulty of getting farmers to combine. One witness says:—"The Society failed from want of support from the farmers." Another:—"As to co-operation amongst farmers in my district in buying and selling, you cannot get them to, I am sorry to say." A third witness says:—"The farmers in my neighbourhood will never unite." A Bedfordshire farmer says:—"The Board of Agriculture have been trying to get some 20 of the gardeners on one of the small estates to amalgamate and send their produce to London together, but have given it up in disgust; the men did not appreciate their efforts."

Some English witnesses assert that while co-operation may be beneficial for small farmers the large farmer buys and sells in sufficiently large quantities to be able to get equally good terms as would be granted to any co-operative body. The evidence indeed shows that in the opinion of witnesses the advantage of co-operation is specially marked in the case of small holdings. The Irish Agricultural Organisation Society, for instance, is confident that "when small farmers learnt the advantage of co-operating, they would very soon join, and then by means of their societies the Association would be able to get reforms carried out more quickly. Out of some 500,000 farmers in Ireland, we have 200,000 who live on holdings of between 1 and 15 acres. But it is to these very small men whom you would hardly dignify by the title of farmers that our co-operative work has been so beneficial. It is only by association with his neighbours that the small holder can possibly hope to get for his produce on the market anything like a reasonable price."

The evidence indicates the benefit derived from co-operation in competing foreign countries. The co-operative system of Holland, for instance, enables Dutch farmers to make butter of a uniform quality and put it on the market to more advantage than can the English farmer. In France, co-operative marketing by small holders, and particularly the small fruit-growers, is largely practised. "French vegetables and fruit," before coming here, are graded by the dealer, so that on leaving his hands, it is no longer the mixed produce of A, B and C, but uniform, and the individual fruit grower's interest in the produce is absolutely lost." This method, however, can only be carried out when small growers sell their crops outright to the dealers on the spot. Several witnesses extol the Danish system of co-operation as regards meat and dairy produce, and, referring to attempts which have been made to establish large co-operative bacon-curing factories on the lines of those in Denmark, it is pointed out that, so long as we keep to our present system, we cannot hope to compete with the foreign farmer. Other evidence shows that Danish farmers keep a larger stock of cows and pigs per acre than any other country and that the pigs are turned into bacon at the least possible cost, as the farmers have their own dairies and slaughter-houses in every district within easy reach of the farm, thus lessening cost and promoting uniformity of quality.

Insects of German East Africa.

By H. v. P. BERENSBURG, Office of the Government Entomologist.

NOTWITHSTANDING the fact that Natal belongs to another zoo-geographical region than the above-named, it seems to me in reading through the "Reports of the Entomologist of the Kaiserl. Biologische Landwirthschaftliche Institut at Amani, G.E.A.," that they have in that country many of the pests common to Natal. Therefore it may be interesting for the readers of this *Journal* to become acquainted with some of them, the more as they, not being known yet as pests here, may become so when certain plants are cultivated.

The Plague-locust—which is not the same as in Natal—does as much damage as, if not more, than our Red-locust. A small green or sometimes greyish insect belonging to the same family and named *Concephalus nitidulus* Scop. often destroys the whole rice crop, eating the ears and damaging them in such a way that it does not even pay the cost of labour to reap the rice afterwards. *Zonocerus elegans* Thunb. the totosiana of Natal, seems to do much damage to plantations of coffee, cotton and castor-oil plants, and to cultivation generally. The gardeners in Natal know what a troublesome insect this is and how difficult it is to safeguard their young as well as their older plants against this disagreeable pest. Hand-picking in the early morning, when the insects are still sluggish and can easily be gathered in a bucket of water on the top of which a thin layer of paraffin is spread, is recommended as the only efficient remedy to get rid of them. Birds and predacious insects will not attack them, because when touched they eject from the back a nauseous yellow liquid, which is said to cause inflammation on the mucous membrane of sensitive collectors.

Chrotogonus hemipterus Schaum., another locustid, is a small species, earth-coloured, and therefore difficult to detect. It also does a great deal of damage to young vegetables and seedlings. Fowls, which were allowed to run free in the gardens, kept this pest down to a reasonable limit. This hopper is also found in Natal and is well known to amateur gardeners.

The cotton plant is the host of many insects, some of which are great pests and often destroy whole crops. A caterpillar of a small moth—a species of *Gelechia*—attacks the cotton-bolls, destroys the seeds and probably pupates inside them. As a remedy the bolls were exposed on corrugated iron sheets to the sun which killed the worms. Experiments with lamps to attract the moths at night time gave unsatisfactory results. Furthermore, in passing the cotton through the ginning-machine, great numbers of caterpillars were destroyed or injured, so that

they died afterwards; but such as were inside the seeds escaped uninjured, which indicates that the pest can be carried in the seed.

Another small moth, a *Pyralid*, cuts the cotton leaves from two sides and rolls them then together, fixing them with a few silk stitches. This moth was identified as the cotton-leaf roller, known scientifically as *Sylepta multinealis* Guen. The damage done is not of so much importance, as the insect never attacks the flowers or the bolls, but restricts its work to the leaves, which dry up and then hang down vertically, giving the plant a rather sickly appearance. When the caterpillars have pupated in these same rolls the plant will soon recover, and no great damage results. July was the principal month in which they occurred. Squeezing the caterpillars and the pupae in their shelters is given as a remedy.

In the Durban Museum collection of moths a few specimens of this Pyralid are present, labelled "caught in Natal at lamp-light." Thus, there may be some probability of it becoming a pest in the cotton-growing districts. Mr. John Kirkman observed last year in his cotton fields at Esperanza a dirty-greenish caterpillar, which disfigured the cotton leaves in a similar manner, attacking the plants in March. The moth, which was reared from caterpillars, is a yellowish creature with brown, dark mottled bases of the forewing and a golden sheen over wings and body, and named *Polygrammodes sabelialis* Guer. The leaves which accompanied the caterpillars as a supply of food showed mines made by some small leaf miner, and ultimately a very tiny moth emerged from them.

The caterpillar of the vine-hawkmoth (*Chaerocampa celerio* Linn.) and another of an emperor-moth (*Saturnid*) destroyed a whole plantation of cotton near Dar-es-salam. Both these genera being represented by many species in Natal, it will be advisable to look out for their appearance in cotton fields.

Hawkmoths' larvae are easily recognisable by the long horn on the last segment, and saturnid caterpillars by rows of bristly spines all over the body. Hand-picking is the recommended remedy.

The tops of the young shoots of the cotton plant are attacked by *Earias insulana* Bisd. (of the Family *Noctuidae* and Sub-family *Noctuinae*), the larva of which bores into them and causes them to wilt and die. The moth is very variable, light green forewings and white hindwings, forewings often with a brownish band. In Egypt this moth is considered the worst pest of the cotton plant. In Natal it comes frequently to the light, and its caterpillars feed on the seed bolls of *Hyliscus*. There are some more representatives of the same genus in Natal, and it is very probable that the moth will take to cotton if opportunity offers itself.

The Red Bollworm (*Gelechia gossypiella* Saund.) does injury also to the cotton-bolls. As yet I am not aware of its presence in Natal.

Picking and burning the bolls is given as the only successful remedy.

Of the bug family, or *Hemiptera*, mention is made of a red-bug (*Dysdercus*), a handsome insect, which occurs also in Natal, then of *Oxyacarenus hyalinipennis* Costa as a doubtfully injurious insect, and of *Callidea rufopicta* Wlk. and of *Dysdercus supersticiosus* F., from Tabora. The latter bug has been caught at Malvern, Natal.

Jassidae (leaf-hoppers), which are also found plentiful on other forms of cultivation, do not appear to do much damage. A small green cicada abundant on cotton and castor-oil plants in German East Africa is probably the same as the one which was reported from Stanger Experimental Farm as doing harm to cotton; but, on closer inspection, it appeared that other influences were responsible for the harm done. The same cicada was also present in the cotton fields at Esperanza and Umzinto. Being a native of this country and being found plentifully in grasses and wild growths, it is easy to understand that they abound in cotton fields surrounded by grass, especially near water.

Snout-beetles (*Cucullionidae*), leaf-eating beetles (*Chrysomelidae* and *Halticidae*), and two species of leaf-eating ladybirds (*Epilachna*) were found to do little damage to the foliage.

All these beetles are represented by allied species in Natal. Two further insects of the same order are mentioned as injuring the cotton seeds; these are *Tenebroides mauritanicus* Linn. and *Tribolium confusum* Duv. Cotton seed is also attacked by a tiny moth of the family *Tineidae*; the injuries are very important, as they appeared by thousands in the stored seed bags. Submerging the bags for twenty-four hours in salt water has proved successful. Quick drying afterwards is essential to prevent the immediate germination of the seed. The thin layer of salt on the seeds seems to preserve them from further attacks of the insect. Aphids and mites (the latter deforming the tops in a similar way as the former), termites and millepedes, damaging young and half-grown plants, are reported. Against the mites a mixture of flowers of sulphur and powder of lime is employed.

Among fungus diseases is mentioned as occurring at Kilwa and Mkondaji one called by Dr. Vossler "Brown-stem," which was thought first to be caused by insects, but of which no evidence was found. Another, "Red spots on leaves," is more peculiar to the Coast districts. The diseased leaves die and fall off at first, but the plants recover later on and the crops are satisfactory. From Umzinto and Esperanza the same or very similar diseases were reported last year, which caused much anxiety in the beginning, but proved to be of no fatal consequences.

The palm is attacked by a snout-beetle, the palm-borer (*Rhynchophorus phoenicis*) and by the rhinoceros-beetle (*Oryctes boas* Fabr.) In German East Africa the last one is said to deposit its eggs on the apex of the palm, from where the hatched larva bores into the heart of the palm. Repeated attacks of one or more beetles will kill the plant.

in a short time. The presence of the beetle in the palm is discovered by the appearance of the leaf, which looks as if punched. This beetle is very common in Natal and breeds in manure-heaps. The adult beetle has been found boring into the apex of the phoenix palm and feeding on the juices, but the larva of it has never been detected inside.

Tetralobus flabellicornis, the giant click-beetle, is also reported to attack palms. Nothing of this kind is as yet known of it in Natal, where it occurs in great numbers.

The coffee plant is attacked by several insects, the worst of which is the coffee-bug (*Anthesia variegatus* Thunb. var. *lineaticollis* Stal.) Losses suffered by this pest in two plantations alone amounted to £2,000 and £750 respectively. The entire losses in all plantations will amount to more than £5,000 (100,000 marks). *Anthesia variegatus* Thunb., the coffee-bug, is responsible for much damage to coffee in Rhodesia, and also occurs in Natal. The next important pest is a longicorn beetle, the well known coffee-borer (*Anthores leuconotus* Pasc.), the larva of which lives in the interior of the stem. One German planter had recourse to cutting out the larvae. With the help of a specially trained staff of natives, he was able to remove from 10,000 to 20,000 larvae per week. The wounds caused by the extraction of the grubs healed very soon, and there was no ill effect on the trees. If the affected plants have to be removed, it is important to burn them, because it has been proved that the larva is able to live in the dry wood for months and for years and to develop the adult beetle. The failure of the coffee-growing here in Natal has been ascribed for the greater part to this pest.

The Ricinus, or castor-oil plant, suffers from the larva of an imperor moth (*Nudaurelia Wahlbergi* Boisd.) This beautiful yellow moth is plentiful in Natal, and its larva feeds principally on the same plant. The damage done is not recorded because the plant is not cultivated commercially.

A borer moth, probably *Duomitus capensis*, has been found to destroy the older trees (the younger plants are not attacked, the larva needing the woody inside as food to its devolment). This same moth feeds on the same food-plant in Natal.

The larva of a butterfly, *Eurytela dryope* Cram., feeds on Ricinus in Natal. Very small bugs (*Capsidae*), a slender yellowish bug (not specified) and several species of *Chrysomelidae*, leaf-eating ladybirds (*Epilachna* sp.) and snout-beetles do little damage. The Oleander hawkmoth (*Daphnis nerii*) is said to injure the Chinchona tree; here in Natal it lives on the Oleander, but its damage amounts to nothing. Hand-picking is recommended as a remedy. Bugs of the genera *Disphinctus*, *Aniscocelis*, *Cimea Capsidae* and *Lygae*, and the beetles *Lycus trabeatus* Guer. and *Lycus cuspidatus* Kr. are reported as enemies of the Chinchona. Representatives of all these insects are found in Natal. *Lycus* is very plentiful, but has not yet shown an inclination to attack cultivated plants.

Imported Eucalyptus trees have suffered under the attack of a bug (*Disphinctus?*). The larvae of a *Melolonthid* beetle killed an older Eucalyptus tree, being found in hundreds on the roots and destroying them. Cutworms are said to attack vegetables and grasses just as here. The diamond back moth (*Plutella cruciferarum* Zell.) does much damage to cauliflowers, turnips and others. It is sufficiently known in Natal.

Flowers are attacked by a host of insects. *Globulla pankratii* Cyr. attacks lilies; its caterpillar begins to eat the leaves, and then enters the bulbs, which it destroys completely. Here in Natal two species of the genus *Diaphone* and well known *Diaph. eumela* Holl., a black caterpillar with white spots, and *Diaphone dominica* Cram., caterpillar reddish-brown with white or yellowish bands and spots, attack all plants belonging to the family *Liliaceae*.

The orange butterfly (*Papilio demoleus* Linn.), our most common butterfly, which feeds here in Natal on young orange and lemon trees, has taken to the same food in German East Africa.

A kind of mealy bug (*Dactylopius*) is found on the roots of asparagus, horseradish and turnips. A melon fly (probably *Dacus ferrugineus* F.) causes the fruit of cucumbers and allied plants to decay just as in Natal. *Peronospera cubensis* B and C, a fungus disease, is common to the *Cucurbitaceae*. Flowering roses, carnations, cannas and others are disfigured and destroyed by a blister-beetle (*Mylabris bihumerosa* Mass.) Its cousin, *Mylabris transversalis* Mass., is very destructive to flowering beans, roses, and a host of other flowers in the Garden Colony.

Flies are mentioned as disease-carriers; several Tsetse-flies occur, such as *Glossina morsitans* Westw., *Glossina fusca* Wlk., *Glossina pallidipes* Aust. *Morsitans* and *pallidipes* are reported from Bukobo, and *fusca* from Mayumba, and the latter one is suspected as the conveyor of the germs of the so. dreaded and still incurable "sleeping-sickness," because this disease occurs at Mayumba, and *Glossina palpalis* has not yet been found there. The genus *Tabanidae* (horse-flies) is represented by *Pangonia varycolor* Wied. and *Hippobosca francilloni* Leach. The genus *Stomoxys*, a fly much alike the house-fly but biting, exists in great numbers, and is identical with the stable-fly of Natal. Mosquitoes, both *Anopheles* and *Culicidae*, are richly represented. Ticks are mentioned on calves and cattle from Zanzibar, Dar-es-salam and Ujiji.

A special tick as the propagator of the Recurrent-fever is reported from the Karawan-shelters at Masoudi.

Tsetse flies occur in the northern part of Zululand, *Tabanidae* everywhere in Natal. Mosquitoes and ticks are sufficiently known by everyone as not to merit special mention.

There is no mention made of scale-insects in the Report of the Entomologist of German East Africa, but there is no doubt about their presence in that Colony, myself having found them plentifully round

Dar-es-salam at my last visit to that place four years ago. Being then not especially interested in these insects, I did not take any notes as to species and food-plant. From the report it is evident that there are many insect pests which also occur in Natal, but which have not become pests here. They may become so when conditions are more favourable for their development.

Turkeys, Their Care and Management.

MR. H. V. HAWKINS, Poultry Expert, in the *Victoria Journal of Agriculture*, writes:—In response to inquiries for hints on the management of turkeys, and the cause of many fertile eggs not hatching, I intend to briefly outline a few points of primary importance in connection with their habits, etc.

In the first place, the Turks had little, if anything, to do with this breed, so that the name "Turkey" was not given this excellent table bird by them, but rather by the Americans. Personally, I am inclined to the belief that the Mexicans discovered the wild turkey, but the credit of vastly improving and domesticating it, and raising the breed to the present standard of perfection rightly belong to the Americans. In any case, I am content to know that the Americans have farmed turkeys for so many years, and have wonderfully changed their type, colour, and habits, with such splendid results.

The question so often asked is, "Why turkey farming has been so long neglected here?" Those who have done most for the Commonwealth in this regard have been the squatters, who, in many cases, merely keep a few at first to supply a change of menu for mutton. They have little time to devote to the care of these birds, still, in most cases, the result has been great success. The reason is not difficult to find, *i.e.*, turkeys, being great travellers and foragers, must have acres. They may be seen in large flocks in the Riverina miles from the station homestead. They have a decided objection to being fed on wheat morning and evening. I have taken particular notice of their method of feeding, and have invariably found that they had good appetites when variety of food abounded, *i.e.*, first a seed, then an insect; possibly a grasshopper would cross their track, and a bad time the grasshoppers get when a flock of 200 bronze turkeys sets sail.

BEST BREEDS TO FARM.

The bronze turkey being large, and the flesh so beautifully white and succulent, is perhaps the breed *par excellence*, yet it should be always borne in mind that the 40lbs. gobbler is not the most profitable to breed. Birds of 14 to 18lbs. weight are usually those which the consumer prefers, provided sufficient flesh is presented to the chef by which he can satisfy a fairly large number of visitors. The black turkey gobbler of

good size, and two years at least, and unrelated, and twelve to thirteen large bronze hens (two years old), make an ideal breeding flock. Many add a very large bronze gobbler, which is unsuitable for the hens, non-fertilisation of the eggs being the result. Each hen averages eighteen to twenty eggs before going broody.

Turkeys need little attention if kept away from fowls and ducks. Turkey farming pays best by itself, and the northern areas are more suitable than the southern. They lay their eggs in a secluded spot; a cement barrel laid on its side with a brick each side to prevent rolling, and a branch of a tree partially covering its entrance, is all they want to encourage them. It is best to permit the eggs to remain in the nest. The hen is usually very cautious on entering and leaving her nest, and seldom breaks an egg, unless she has not had sufficient shell formers in her diet. See that she gets ample cinders, burnt bones, and charcoal, and, when possible, plenty of dry oyster shell. Much depends on the farmer whether she breaks the egg and hatches her young.

MAKING NEST, ETC.

Always provide the hen with an inviting spot and plenty of green grass for the nest; a too dry nest often causes trouble—lack of moisture. In districts in the far north I would strongly urge that one side of the barrel be removed; make the nest on the ground, oval in shape, and keep a fair amount of moisture around the nest. Give the hen opportunity to dust herself in a damp spot; she will get it if possible, and there will be little fear of dead chickens in the shell unless breeding from immature birds is practised. A gobbler at twelve months is not the best. He should be at least two years old; likewise the hens. Above all, introduce fresh blood every second year; this is of great importance in the raising of turkeys for profit. Again, a vigorous gobbler will fertilise all the eggs of a dozen hens in less than four weeks; that is to say, suppose a turkey hen, after she has had the companionship of her mate for say a month, lays seventeen eggs at a stretch, the whole batch laid prior to her brooding will be fertilised. In short, you need only borrow a good gobbler for one month in the season, provided you are not hatching late chicks. See that his toes are not like a razor, otherwise serious results may follow; I have, this season, stitched three beautiful bronze hens, the backs of which had been laid bare.

Of one thing there can be no doubt, turkeys do best in the fresh air, and will not stand coddling; they should be housed in large airy sheds, open completely on the eastern side, with perches fairly wide, (three to four inches). The straighter the breast bone, the better satisfied will the consuming public be, and narrow perches mean crooked breast bones. Do not place the perches too high, especially where the ground is hard or stony, as turkeys are, like fowls, subject to bumble feet, which often spoil hens for a whole season. I am quite convinced that turkeys must be encouraged to accustom themselves to shed roosts: they prefer the limb of a tree or the top of a harvester, but that should not be. A little coaxing for a week, a kindly bucket of oats by way of encouragement, will do much to form the habit of coming home each night at dusk, instead of their straying away, or being found in the field in the morning with their heads off—the work of foxes, which are very troublesome in most districts.

FEEDING TURKEYS.

The adult birds usually find most of their own food, yet it is an absolute necessity to feed the flocks when natural foods are not available, *i.e.*, in the autumn and winter they get down in condition if not attended to, although they may have unlimited range. Insect life is then scarce, grass is of poor quality, and is also usually wet, and the consequence is they scour and often die from the effects. Barley meal, maize meal, and bran (one part each), with a fair amount of chopped up boiled rabbit, and when available a few sliced up raw onions, all mixed with the soup in which the rabbit or other animal food has been boiled, should be used. Mix as dry as possible, turkeys do not thrive on slops. Curded milk is much relished, and is a splendid flesh former, and a whitener of flesh; nothing is more objectionable than a *fatty* breast. Too much maize feeding, or a constant supply of wheat, will not improve the colour of the flesh. Oats are by far the best of the grains to assist in keeping down fat.

Fresh Water.—Always provide fresh clean water daily, and keep the vessel out of the sun; neglect in this regard will cause losses by disease. Add charcoal in case of bowel disorders; it is an absolute necessity in successful turkey raising.

Grit.—They must have an unlimited supply of grit, without which they suffer much from indigestion. Small pebbles, coarse sand, and pieces of broken crockery, and smashed up burnt bone all aid in digesting their food; this is especially required prior to their going to roost.

Boiled Grain.—There is no necessity to boil any grain; they are better without it, and prefer the hard food to that of a sloppy nature.

Egg Producers.—The so-called “egg producers,” mentioned by some of my correspondents, would, if fed in sufficient quantities, in some cases assist egg production, but at what a cost? The best egg producer is insect life, and when not available in sufficient quantities, add the best substitute, *i.e.*, beef and mutton scraps, sheep or bullock’s liver, or rabbit, soaked in cold water overnight, and then lightly boiled. Use the liquid for mixing the morning meal, and avoid making it pasty, but use the hands well in mixing it hard and friable. Curded milk when available should be a magnificent aid to egg production, and when topping turkeys off for market, give them as much as they will take, as it softens and whitens the flesh; milk fed turkeys eat like six weeks old chickens.

Young Turkeys.—For young turkeys many successful raisers use hard boiled eggs mixed with stale bread crumbs, and a little fine oatmeal, moistened with skim milk (crumbly, not sloppy). This is given the very young chicks for the first week, after which eggs should *not* be given, but plenty of finely pulped raw onion added, and with it milk curds, and a little dry bone meal and charcoal mixed well through. This not only keeps their bowels in order, but supplies the additional phosphoric acid necessary to quick growth of bone, and increases stamina, thus decreasing the chances of “leg weakness,” a complaint to be guarded against. Encourage the very young turkeys to eat millet seed at night, and after two weeks feed on hulled oats for best results, until old enough to have a little wheat or oats.

Keep the young turkeys dry. Nothing kills quicker than long wet grass; once they get a soaking, deaths may be expected. Always keep

them in confined pens, well sheltered from wind and rain. Do not on any account allow them on the dewy grass, but keep them in until the sun has dried the grass off a little. Examine all young poults for vermin, which is so troublesome at the back of the head and near vent; hundreds of birds die through no other cause. The pest is similar in habits to the tick, holding on and penetrating the skull. The young birds should be freely dusted with insectibane, and a little carbolic paste applied at the back of the head. Neglect in this matter is the cause of many deaths. The fact that late hatches do not develop as fast as the early hatches is of the utmost importance to all farmers of poultry, be it turkeys, ducks, or fowls. The early chicks may be relied on to produce the best results. The longer a hen lays in a season, the more impoverished she becomes as a result of hard work. Thus we find the embryo becomes smaller and weaker, and it is from these late poults we get bad symptoms, first catarrh, often the precursor to a more serious trouble, *i.e.*, roup, or to make it clearer, a running at the nostrils is observed, and later, symptoms show a swollen head, from which arises an offensive smell.

Onion tops, dandelion, rape, and raw onion finely cut, and white clover, are without doubt the favourite green foods with turkeys; and they are rich in mineral salts, and valuable as correctors of the blood. From five weeks old and on, this can be given mixed in the morning food (pollard, brand, etc.)

If the pasture has a variety of grasses, so much the better, as they prefer variety, but if it be a dry doughty spot, sow lucerne in a 1-acre enclosure. After it becomes established, it will keep you supplied with green summer food, being rich in protein, and also an egg producer.

Area.—One hundred adult turkeys could easily be run on five acres, but, unless the owner is compelled to fence, I would advise giving them full liberty, as they will not require so much feeding. It is rather difficult to say whether three feet and three added wires on top will suffice to keep turkeys in; much depends on the way they have been brought up. If at all wild fifteen feet would not keep them in without doctoring the wing joint.

Domesticated poults are usually tamer than Leghorns, and give less trouble in this respect. I would certainly recommend trying 3-ft. wire, with four plain ones above, but care should be taken when putting in posts. Do not use too thick a post, for this reason, that if the posts are "table-topped" they allow ample room for a gobbler to fly on to; the others will soon learn the habit. Further, wide top posts are a source of great danger where foxes are plentiful. Run the wires above the thick posts, attached to thin hardwood batten. One morning I saw fourteen headless turkeys in a 5-acre enclosure at Buninyong, and traced Mr. Reynard's hair on a thick 6ft. high corner post, which was 25 inches in circumference at top, and unbarked. Had the barbed wire covered the top of the fence this loss would not have occurred.

I would strongly advise all of my readers who have acres in the Riverina, Wimmera, or Goulburn Valley to raise turkeys for market, as they will pay equally as well as lambs. Recently at Geelong I saw prime gobblers realise from 22s. to 27s. per pair at auction. A leading Melbourne firm also informs me that prime turkeys, topped off with a good

handful of short white oats at night two to three weeks before marketing, will always command top places. During Show week, and prior to Cup week, turkeys sold at their rooms up to 25s. and 27s. 6d. per pair. Dr. Wight, of Kyabram, makes a hobby of raising turkeys, no less than 150 birds being raised successfully by him during last season. Mrs. Goddard, of Moama, has also had great success with them.

The main thing in marketing is to top off and grade the birds according to size, not putting three big gobblers in a crate with five or six wasters. Mark your crates first, second, and third quality, and you will be quite satisfied when account sales come in. Make the agent your friend, it creates confidence, and he will do his best for you; the farmer who is always chopping and changing about makes a serious blunder. Keep in touch with your salesman; tell him how many birds you will have for disposal, and ask him to wire you when scarcity of white flesh exists. Don't rush him with twenty crates when ten will suffice; the agent usually knows when to advise you to send, and the cost of a telegram often pays.

District Reports.

EMPANGENI, 4th January.—Rain fell on twelve occasions during past month. Total fall registered was 3.05 inches. Blight in amabele first reported 21st ult. On same date information was received to the effect that the *amalanda* birds (species of small white crane) were doing marvellous work in the way of destroying "hopper" locusts. Cattle and all other stock are remarkably fat and sleek. Potatoes produced by Messrs. Patrick Addison, of Lots 105 and 108 Mhlutuzi, and Jan Hoogvorst, of Okulu Store, have grown to as much as a pound in weight and over. Only four head of cattle were reported to have died—two from Gallsickness, one from abscess, and one from effects of being gored by another beast. Many gums, *Auracaria Cookii* and *Casuarina Leptoclada*, were planted about the official buildings and Magistrate's residence to replace other trees which have died out. Four lions were reported to have visited the Thorns, in this Division, between the White Umfolosi and Useleni Rivers, and to have killed two quagga and one rietbok, so far as is known, in their peregrinations.

A. R. R. TURNBULL, Magistrate.

IXOPO, 11th January.—During the last month a great quantity of rain has fallen and the crops are looking remarkably well. The floods have done considerable damage to the railway construction works, nevertheless the contractors, under the able directions of Chief Engineer Sweetman, are progressing rapidly with the extension of the line. So

far no cases of East Coast Fever have occurred in the Division, but the Border of Alexandra Division is still guarded, owing to the outbreak at Dudutu. Numerous swarms of locusts have hatched out in almost every part of the Division, and I hope before long that officers will be appointed to superintend the destruction of the locusts. [Authorisation to appoint officers has been given. 14/1/07.—*Ed., Ag. Jour.*] It may be interesting to farmers in the Division to know that the following sums were collected by this Magistracy for the year ending 31st December, 1906:—Hut Tax, £7,274 8s.; Dog Tax, £996; Poll Tax, £3,827; Pass Fees, £557; Fees on Medical Licenses, Law 19 of 1891, £183; Squatters' Rent, £571; Native Marriage Fees, £244; Fees on Registration of Christian Marriages, £18 10s.; Fees and Fines, £1,981 17s.; Retail Store Licenses, £153; Tout Licenses, £10; Renewal Identification Passes, £54 5s.; Renewal Poll Tax Licenses, £5; Crown Land Instalments by Natives, £494 11s. 4d.; Fees in Native Civil Cases, £159 18s. 6d.; Fees in European Civil Cases, £135 13s.; total, £16,665 2s. 10d. During the year 1,745 native births and 754 deaths were registered. This shows the natural increase exceeded the deaths by 991.

FRANK E. FOXON, Magistrate.

NEW HANOVER, 14th January.—Rain has been pretty general throughout the district, the crops are all looking well as far as growth is concerned, but there are numerous insects at work. The mealies are eaten up with grub, and numerous beetles are making havoc. Hopper locusts are reported throughout the district and are attacking the crops. Government have been notified. Wattle industry is increasing; high prices are now paid, stripping is proceeding. There is a dearth of fruit owing to the hail and frost during the spring. Fowlsickness (Upenyane) still prevails, many farmers having lost all or the greater number of their fowls. Eggs are fetching 1s. 3d. per dozen on spot. Horsesickness has not made its appearance as yet. The district is entirely free from it. There have been no cases of East Coast Fever in this Division.

P. D. DANGERFIELD, Acting Magistrate.

PINETOWN, 17th January.—Since writing my last report the weather has been very showery, but there has been no heavy fall of rain. Generally speaking, we have had sultry mornings followed by wet afternoons and misty nights. Two mules have died from Horsesickness, otherwise the Division is in a perfectly healthy state. East Coast Fever is, I am sorry to say, spreading, but I have not heard of many deaths. Reports have come in from Illovo, Amanzimtote, Umbumbulu, and Upper Umlaas that locust hoppers are very plentiful and are likely to be troublesome. The mealie crop is looking well, and, judging by present

appearances, there should be a good harvest this year. The market here is well supplied with vegetables and pineapples. There has been a plentiful show of mangoes, but, I think, owing to the wet weather we have had, the fruit has fallen from the trees without ripening. Native labour is particularly plentiful just now and the wages asked very low. The Trappist Crossing still remains in a dangerous state.

H. E. GRANT, Acting Magistrate.

RICHMOND, 12th January.—For the month of December 6·82 inches of rain were recorded; highest temperature, 93 degrees on 4th and 24th; lowest, 48 degrees on the 6th. The farmers in the Rosebank neighbourhood have suffered severely from heavy storms. In many instances crops have been swept away and replanting rendered necessary. Considerable loss has been sustained by many in having their land, containing artificial manures, washed into the veld. The Byrne district was visited by a tornado, which destroyed all trees and buildings within its range. Oak and other trees, which have withstood the ravages of storms for years, had their branches twisted and snapped off near the parent trunk. Nothing could withstand the fury of the wind. Mr. Cunningham had the roof of his residence blown off, and the circular action of the wind is proved by the fact that the iron forming the roof was deposited on the countryside on every side of the house. The crops, which from their situation were not exposed to the action of floods, look exceptionally well, and give promise of a good harvest. Stock of all kinds are free from disease. On the 22nd and 29th November public meetings were held at the Court House, at the request of the Veterinary Department, to discuss the advisability of placing the Division under quarantine in connection with endeavours being made by Government to cope with East Coast Fever amongst cattle. Veterinary Surgeon Amos attended the second meeting, and explained in a lucid manner the plan of campaign adopted by his Department. After considerable discussion, the meeting, which was attended by the general public, many of whom owned no stock, rejected the proposal to place the Division under quarantine by 26 to 11 votes. It was to be regretted that the farming community was not more fully represented. Many considered that they were too busy on their farms to attend, and were surprised at the decision of the meeting.

A. W. LESLIE, Magistrate.

The workman in Queensland is not finding the Compensation Act all that he expected it to be. Under the Act, unless a workman is laid up for fourteen days he can claim no compensation. Now the Act is in force the employer has lost all sympathy, and immediately a man is hurt, say, for only a couple of days or so, his wages are stopped. Besides, if a man is hurt in the bush, before he can claim compensation he has got to get a doctor's certificate. Is it not all beer and skittles.

Gardening Notes for February.

By W. J. BELL, Nurseryman, Florist and Seedsman, Maritzburg.

KITCHEN GARDEN.

EARLY varieties of Cauliflower may still be sown (excepting in the colder parts of the Colony), such as Early London and Early Erfurt.

Sow for winter crops Cabbage, Brussels-sprouts, Savoy, Scotch Kale, also Radish, Lettuce, Turnip, Carrot, Onion, Spinach, Beet, etc.

The main crop of Broad Beans and Peas should now be sown. Broad Beans should be sown four inches apart and two inches deep in drills four feet apart.

To secure well filled pods pinch off the tops as soon as the lower pods begin to set. A little lime or wood ash should be forked in when preparing the ground.

Sow Peas in drills not less than three feet apart, about 1½ to 40 feet of drill. A rich soil well pulverised and incorporated with a fair allowance of well decayed manure should be chosen. Varieties that do well are Yorkshire Hero, Pride of the Market, Harrison's Glory, Fillbasket and Doctor McLean.

Celery may now be planted out in trenches, selecting strong young plants about six or seven inches high.

The trenches should be dug out not less than two feet in depth, and should contain about twelve inches of good soil and well rotted manure in equal proportions. The ground selected should be high, where water will not drain into the trench.

Some growers do not use trenches, but make the soil deep and rich and plant in rows, earthing up with the spade.

When earthing up carefully close the stems and leaves to keep out the soil and promote unchecked growth by copious supplies of liquid manure.

The main crop of Cauliflower should be planted out this month in rich ground, as the soil can scarcely be too rich for this crop. Plant the large varieties, such as Autumn Giant and Giant Italian not less than three feet apart and the smaller sorts two and a half feet apart. Should dry, hot weather set in immediately after planting, the young plants should be carefully shaded and regularly watered to prevent a check, which will throw them back several weeks. For the colder districts Broccoli does better than Cauliflower, and may be treated the same in every respect.

In warm districts free from winter frosts, Tomatoes should be planted out in sheltered positions.

Plants now in bearing should be kept watered in dry weather after mulching the surface round each plant with half-decayed manure.

FLOWER GARDEN.

All seeds sown this month will require special care, shading and watering, and all watering must be done early morning and towards evening.

Where frosts are not too severe in winter, the following varieties of flower seeds may be sown now for winter flowering:—Aster, Candytuft, Dianthus, Phlox Drummondii, Antirrhinum, Browalia, Coreopsis, Cornflower, Gaillardia, Godetia, Larkspur, Calendula, Lupin, Mignonette, Nicotiana, Pansy, Stock, and Petunia. Where the soil is poor and hard a special preparation is necessary, and some well decayed manure, leaf or vegetable mould with a little sharp sand should be forked in where the seeds are to be sown. This will form a good surface, which will not be so liable to harden with alternate rain and sun. Make the surface fine by passing some of the compost through a sieve, and, after giving a good soaking with water can, sow the seeds thinly and evenly and cover slightly with a little of the same compost also passed through the sieve, just sufficient to cover the seeds. In the case of larger seeds cover a little deeper.

Afterwards cover with grass, hay or straw. This may be partly removed as soon as the seedlings appear, and then as they get stronger remove the shading altogether choosing a dull day if possible. What is required is to gradually accustom the young seedlings to the sun as they become strong enough to bear it.

Evergreens may still be planted with success during wet and cloudy weather, and it is a good time to put in all kinds of evergreen fruit trees, including Oranges, Naartjes, Lemons, Loquats, China Guavas, Mangoes, Avocado Pears, etc.

Thuja and Japan Privet fence plants will do well planted now, choosing favourable weather. These for fence purposes should be planted half a yard apart, taking care to cut away about a third at least of the wood from the top when planting.

Where wind breaks are required, the sooner these are planted the better. For up country, hardy Cypresses of a spreading habit are the most suitable and effective, as they will stand frost and wind better than most things and are fairly quick in growth, and to make a variety several kinds of Pines may be included.

For the warmer districts the planter has a wider choice, and may include Eugenias, Lagunaries, Blackwoods, Australian Willows, and Gums.

Some Kraal Manures.

By ALEX. PARDY, F.C.S., Analyst.

THE results of the analyses of some local manures recently received from various sources are of some interest, in that they show very marked differences in composition, due largely to their sources and the conditions under which they have been laid down.

The following gives some of the details of these manures:—

	I.	II.	III.	IV.	V.
Moisture	68.08	59.60	32.11	41.66	16.11
Organic and volatile matter . .	21.34	30.84	16.13	30.16	54.41
Ash (including stones, etc.) . .	10.58	9.56	51.76	28.18	29.48
	<hr/> 100.00	<hr/> 100.00	<hr/> 100.00	<hr/> 100.00	<hr/> 100.00
Nitrogen	0.56	0.62	0.55	1.47	1.65
Phosphoric Acid	0.28	0.17	0.34	1.20	0.49
Potash	0.50	0.45	0.69	1.38	1.66
	<hr/> 1.34	<hr/> 1.24	<hr/> 1.58	<hr/> 4.05	<hr/> 3.80

No 1 from calf sheds contains a higher percentage of moisture than any of the others; it represents a fairly well-rotted manure well mixed with hay bedding and made under shade.

No. 2 is of mixed origin associated with a large proportion of litter; it had been collected in sheds and afterwards placed outside in a loose heap exposed to the weather, consequently it shows signs of having suffered thereby.

No 3 is a stable manure of a much drier nature than either of the preceding two; the sample contained a large amount of earthy and stony matter, which detracts considerably from its value, weight for weight of dry matter eliminating the stones; it is richer than No. 2. A cleaner sample would show a fairly high fertilising value.

No. 4 represents a carefully prepared manure consisting of cattle droppings mixed with a small quantity of bonemeal. Very little litter of any kind is incorporated in the sample, consequently it is nearly pure dung, plus the little bone meal. The phosphoric acid in the sample is very much higher than that in any of the others, due to the bone, which has considerably enhanced its value. All three constituents are well represented.

No. 5 is of the same nature as No. 4, with the exception that no bone meal had been added. It is drier than No. 4, and, if equal weights of dry matter be taken, is poorer all round.

The amount of fertilising ingredients contained in the various manures per ton is as follows:—

	No. 1	No. 2	No. 3	No. 4	No. 5
Lbs.	26.8	24.8	31.4	81.0	76.0

It is almost impossible to place a value on such manures as these as the agricultural value does not depend on the essential ingredients alone, but is due probably in greater part to the organic matter and the peculiar nature of the material, so that a mere trade valuation would not adequately represent either the commercial or agricultural value.

These are complete manures, containing, as they do, all the elements necessary to plant growth, and when used either alone or supplemented with artificials form an acquisition to the farm which cannot be too highly estimated or on which too much care cannot be bestowed.

ALEX. PARDY, Analyst.

Correspondence.

HELLEBORE FOR KILLING TICKS.

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

SIR.—I have been transport-riding for a good number of years (28), and have tried a good many so-called remedies to kill ticks. For the last six years I have worked between Port Shepstone and Kokstad—a tick-infected district, with the tortoiseshell tick most prominent. Hellebore powder mixed with oil or melted fat is the only remedy I find that will kill the black and white tick, called by the kafirs "Xoloquibe." I will guarantee that with one dressing of Hellebore that the ticks will die and drop off within a week from the day of dressing. The Government dip has absolutely no effect upon the Xoloquibe.—Yours, etc.,

W. H. STAFFORD.

Brookside, Harding.

[With regard to the above, Mr. Power, of the Veterinary Department, says that hellebore is well known as an efficacious and useful agent for destroying ticks by hand-dressing. With respect to Mr. Stafford's last remark, Mr. Power says that when the arsenic dips are fresh they kill the ticks, but when they grow stale that power diminishes.—ED., *Ag. Jour.*]

BRAZILIAN LINEN.

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

SIR,—I enclose a cutting from an American paper which may be of interest. It describes a new fibre which has been discovered in South America. Perhaps the Director of Experiment Stations might be induced to give it a trial on the Coast Experimental Farm. The following is the cutting:—

The American Consul-General at Rio de Janeiro has submitted a report to the Washington Department of Commerce on the plant known as "Brazilian linen," which he thinks may revolutionise the linen industry of the world. The new plant, which is indigenous to Brazil and some of the great fertile plains of South America, is technically described as "*Canhamo brazillensis perini*," being named after its discoverer, Dr. Victorio Antonia de Perini, and its practical development is now being effected upon several experimental plantations. The development was commenced with the assistance of the State Government, and has continued to a point where it may be stated without fear of question, according to the report, that the fibre is a success and that its influence will be felt at once in the fabric world. The product of the plantations now established has been contracted for by British interests at a very profitable rate. The plant grows from twelve to eighteen feet high in four or five months, resembling in general appearance the hemp. It is absolutely hardy. Three crops a year can be had. The discoverer and the Brazilian interests claim that they can produce a fibre equal to the best European lines, and that this plant can be grown under such conditions that the production of this fibre will be cheaper and greater than that possible with the European article.—Yours, etc.,

R. W. BRADSTREET.

Toronto, Canada, 15th November, 1906.

THE AGE OF A HORSE.

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

SIR,—In last month's number of the *Agricultural Journal* I noticed an extract in it taken from *The Field* referring to the age horses have been known to attain, and I give you the following case which I am sure will interest you and your readers:—

While planting in India, I had charge of a property which adjoined an estate which had been 35 years in existence at the time I left the district. On it there was a pony which first came as a four year old and had seen the development of the estate from the time the first tree was cut, and had faithfully served four successive managers. The last time

I saw "Billy," as he was named, he was fully 39 years old, full of life and quite strong. Although he was not ridden by his master at all, yet he was well able to carry the children, and to whom he seemed devoted, following them about like a dog. He was never confined but allowed to go wherever he liked, and, in recognition of his long service, had an attendant to himself and the very best of care. "Billy" was a Royal Pegu, an almost extinct variety of pony found in Burmah. They are noted for their speed, endurance and extraordinary hardiness, a journey of 80 to 100 miles on end being nothing very difficult for them to perform. In character they are somewhat like our local Basuto but better shaped, bigger, and much more handsome. "Billy" died the following year after I last saw him, from sheer old age, being then full 40 years. He was, bar natives, the oldest inhabitant of the district, and quite a notoriety.—Yours, etc.,

W. A. GILBERT.

Barnesdale Tea Estate, Ifafa.

Export of Citrus Fruits.

At the request of the Conservator of Forests, the following notice is repeated:—

In order to encourage the export of citrus fruits during winter, the Minister of Agriculture has arranged that 500 cases (one cubic foot each) will be carried freight free as deck cargo to England, the boxes and local rail transport also being supplied by Government, while the sender supplies the fruit and receives the returns. It is desired that fruits from many farms be included in this consignment. Those who wish to take advantage of the opportunity should apply at once to the Conservator of Forests, who has the matter in hand. The fruit should leave Natal about the end of April or early in May, and the Orchardist, Cedara, will previously visit such centres as can be arranged in order to show how the packing should be done.

In September, 1806, a pony 11 h. 2 in. high, belonging to a horsedealer of Chard, was backed to travel 100 miles in sixteen successive hours. The course chosen was between Honiton and Exeter, a distance of sixteen miles, and this the pony was to cover six times with an additional four miles to compete the hundred. Ridden by a lad weighing little short of ten stone, the pony started at 4.15 a.m. from Honiton, and being liberally rested between the journeys, performed the undertaking with the greatest ease in 13 hours 50 minutes, or 2 hours 10 minutes less than the time allowed.

A Scotch Dairy Farmer.

MILKING MACHINES.

A CORRESPONDENT sends a copy of *The North British Agriculturist* containing a report of a recently delivered address by Mr. Alex. Millar, Huntly Farm, Dundee, on dairy-work. The character of the address and the discussion ensuing is so practical and interesting that we willingly adopt his suggestion to reproduce the report in these pages.

Mr. Millar said: When I received the invitation of your committee to lecture on "Dairy Cows and their Management," I replied at once that I did not think I had any special message "burning to be delivered." It was, however, pointed out to me that a few notes of personal experience might initiate a profitable discussion, so it is only in this hope that I appear before you. I make no pretension that my particular method of management is original or ideal. It has simply been evolved gradually as the necessities of my market and my general farming operations seemed to require. My special line in dairying is butter-making. All the produce of my dairy of 150 cows is sold as butter and butter milk, and as I have a good market in Dundee for butter milk, I churn "whole milk." Separated milk I could dispose of only in very limited quantity, so my market determines my method of manufacture. My special line also determines the

KIND OF COWS

I prefer. For butter-making Jersey cows are undoubtedly the best, but in our northern climate they are not hardy enough to be kept extensively on ordinary commercial lines. So I make Ayrshires my mainstay, and young Ayrshires especially, for I find that when a cow gets up in years she may continue to give quantity of milk, but her digestive apparatus tends to get trickier, and she is not to be depended on so thoroughly for butter-making; so I generally buy Ayrshires, or first crosses off Ayrshires, carrying their second calf, and keep them, if good ones, for the four or five years of their prime. I thus try to steer clear of that wasteful system of keeping cows for only one milking period, and then passing on good dairy material to the butcher—a system that is largely responsible for the tantalising disproportion between the inbuying and outgoing price of our dairy cows at the present moment. Of course, I get landed into cows sometimes that are too long with me at one year, but, on the average, I get four years' use out of my stock, and then what I get for the carcasses is profit. I keep three pure-bred Aberdeen-Angus bulls, the cross calf resulting being almost invariably pure black or pure red, and for these first crosses I have a ready market in the hill farms of Perthshire and Forfarshire. For these "keepers" my regular price for many years has been 50s. for bull calves, 40s. for heifer calves, and this amply defrays the cost of giving the cows a two-months' rest. For my business I require to have my cows calving regularly all the year round. Four calves per week keeps me about right, and thus enables me to keep up a daily supply of 370 gallons, which is what I aim at with 150 cows' milking. As Ayrshires are not much bred in the east of Scotland, I have to come to the west country—usually to Lanark and Wishaw—

TO REPLENISH MY STOCK.

At one time I was in the habit of coming and buying a wagon or so just when I required them, but for a good number of years now I have found it a better policy to buy "back-calves," and graze them. Formerly I had a good many losses, especially in hot weather, through cows going wrong at the calving after coming off the long railway journey, and perhaps having been passed through several marts before I got them, and that at a time when they were ill fitted to stand up against the fatigue of so much knocking about. When I have cows grazed beside me for a time, and well rested, they come through the calving risks much better; and even though sometimes I may not have much for the grazing of them, the lessened mortality keeps the profit and loss account nearer right. And as it is a wise policy to stock the fields heavily so as to make dry cows work for their living, and not lay on too much fat, the cost of grazing does not amount to a great deal. But buying "back-calves" is a risky business too. A good many dairy misfits find their way to the "back-calver" sales—knickers, small teats, and other undesirables are sometimes conveniently got rid of when in this state, and I expect I have had my full share of them. For seven months of the year along the east coast our cows manage for themselves in the fields. Grass comes very early with us—we usually have our cows out about the middle of April. But there are one or two matters connected with their general management that I would advert to first. Cows in the summer months suffer greatly from heat and flies—I have known a drop of twenty gallons due to a single day's galloping. It may seem a paradox to say that cows require shelter quite as much in summer as in winter, but it is a fact nevertheless, and anyone who will endeavour to supply them with shade will be well repaid for his trouble. Clumps of trees, tall hedges, and even sheds are a good investment in this line. Though well-trimmed hedges look neat on a farm, I think the cows would much prefer them a bit rough. The torment which cows suffer from clegs, warble flies, and such like is so great during bright sunshine that something ought always to be done to relieve them. In addition to shade, it is also of special importance that they should have

PLENTY OF GOOD WATER.

When we remember that milk contains 87 per cent. of water, and that a cow will use up for milk-making purposes alone from three to four gallons daily in the flush of yielding, over and above what is required in the vital processes of digestion, we can understand that the water supply must not be scrimp. The best supply is in the form of a running stream or river—those farmers who can command a running water into which the cows can go and stand in the shade of the trees during the hot part of the day are much to be envied. Another point of some importance for keeping stock healthy is the providing of rock salt to cows in the pasture fields. In an ordinary cattle ration there is about three-quarters of an ounce of salt, but a milk cow requires a good deal more than that. The milk drains away fully an ounce per day out of the system, and unless this is supplied the ash material of their vegetable food does not yield enough. It is most instructive to watch how regularly a cow will come for her "salt lick" once she knows where it is to be found, and at the end of the grazing season there is a very noticeable difference be-

tween cows who have had regular access to salt and those who have not. The management of dairy cows in summer is a comparatively simple matter. Their principal food then is grass, which they collect for themselves. Old pasture will yield most butter and cheese per gallon of milk, but new grass will give the largest quantity where the number of gallons is of importance. In some cases the grass may be so good that nothing more is required to make the cows yield their utmost, both in quantity and quality, but oftener it will be found that the addition of some

EXTRA FEEDING MATERIAL

will pay. This usually takes the form of some variety of cotton cake, which, from its binding nature, is specially suitable for counteracting the laxative properties of luscious grass. My own practice is to allow all cows in milk 3 to 4 lb. per day of "Angus" cake, a brand well and favourably known all along the east coast, and which is guaranteed to contain 50 per cent. of cotton seed meal. Bean meal, made into a ball of dough with warm water, I have also used, but this takes more work, and is not so cleanly to handle. By mid-summer, with our limited rainfall on the east coast, pastures often get brown and bare, so I always plan to have a few acres of rye ready to give the cows a green bite. After the rye is shot it ceases to be palatable, so we then give cutting grass, and when that gets ripe, green beans are spread on the pastures. When these are ripe second crop hay is available, and then cabbages. All this supplementary food is spread on the fields, and I find the cows use it up with quite as little waste as there would be if fed in the stalls, and it lessens the labour of the byremen quite a bit. In the case of cabbages, too, it keeps the byres much sweeter when the cows are put out in the morning after milking they find their cabbage ration awaiting them. Eaten in the open air, the essential oil, or other aromatic compound which exists in this plant, gets dissipated out of the system before the next milking comes round, and we thus get rid of that objectionable flavour to the milk and its products which cabbages and soft turnips are so liable to impart. The change on to the

WINTER FEED AND MANAGEMENT

is done gradually. The cows are kept indoors at night so soon as the weather begins to get cold and stormy. As the time goes on, the period they are allowed outside becomes less and less, until they are restricted to about an hour or so. The winter yield of milk has, to a certain extent, to be kept up against Nature by a forcing feed. Naturally, the cows give their full yield of milk in the summer time when the grass is at its best; to make them do the same in mid-winter means a large quantity of rich and costly food. In my experience, it costs two to three times as much to keep a cow during the winter five months as during the summer seven, and the small extra price per gallon is not anything like in proportion to the greater cost of production. The greatest drawback to a cow yielding full milk in winter is the cold—a frosty night or day being immediately followed by a decrease in the milk yield. For those animals which are dry the cold does not matter so much, but those in milk must be kept as warm and comfortable as possible. One of the best things for promoting this end is the use of warmed food. Warm mashes, composed of chop mixed with meals, and made into a sloppy mess

with warm water, and fed at blood heat, is the best expedient for keeping up the milk yield. Cold roots I use very sparingly, and more as an appetiser than as a food. My daily bill of fare at present is something like this:—At 5 a.m. a warm mash, composed of dried grains, ground oats, bean meal, and molascuit is fed, followed by a foddering of sound oat straw; at ten o'clock two stones or so of whole turnips is fed, followed by a good allowance of first crop hay; at four o'clock 4lbs. of "Angus" cake is served out to them, followed by a warm mash, the same as in the morning, and a good armful of oat straw rounds off their day's allowance. A cynical friend of mine, smarting under the not uncommon trouble of term changes, remarked to me the other day that the most difficult part of the management of dairy cows is

GETTING THEM PROPERLY MILKED.

It is no exaggeration to say that the best animals fed and cared for in the best manner may turn out poor yielders if milked by one who cannot, or will not, take the milk from them properly. And good milkers are getting scarcer. The art of milking must be learnt when young; no other work makes higher demands on the tact and temper of the worker. Ill usage or jerky milking spoils many a good cow. A bad-tempered milker is a continual heartbreak, and may neutralise months and years of careful breeding and feeding. There seems also to be a growing dislike to this kind of work—an advertisement with "no milking" brings ever so many more replies. Then, the greater facilities for getting to evening entertainments nowadays renders the milking time next morning a sleepy affair, so that, what with incompetent, or bad-tempered, or sleepy milkers, the lot of the dairy farmer many a time is not an enviable one. To add to these troubles, some infectious disease may break out, say, in some of the ploughmen's families, and the wife milker is debarred from coming to the byre. I was at one time in the unfortunate position of having seven men's wives off at one time through an outbreak of scarlet fever among the cottar children. The mothers themselves were fit enough, but the doctor's notification made their help impossible for six or seven weeks. To get behind these difficulties of milking time the pious wish has many a time been expressed that some mechanical means were available to lighten this burden of daily worry. For fifty odd years repeated attempts have been made to put a milking machine on the market that would milk the cows and not abuse them, and be aye ready when required. It is fully ten years since I first began to use a

MECHANICAL MILKER.

The "Murchland" was my first venture, and I worked it continuously for some years with varying success. It milked the cows fairly well, but it was so troublesome to keep clean that it created labour rather than saved it. Then, it had a peculiar effect on the cows' teats. Working by continuous suction, it caused the skin of the teat to adhere to the metallic lining of the cup, and thus interfered with the blood circulation, so that, when the cups were taken off, the teats were often blue. However, it worked away quietly, and never spoke back—and for that I liked it—so I kept it going, hoping against hope that something better would turn up. When at last the Lawrence Kennedy machine appeared with its pulsating movement, I saw at once that it solved one working difficulty—

the interference with the blood circulation. The "catch" and "relieve" of the pulsating movement—so closely resembling the action of the calf's mouth sucking—made it evident that there would be no more blue teats at anyrate, and the rubber tubing of the Lawrence Kennedy machine looked as if it would be much easier kept in order. So I had it fitted up experimentally at Huntly Farm, and, after three months' trial of it there, I was so well pleased with its work that I ordered an installation for my other farm, and for almost two years now I have had this machine working twice daily on two separate farms, and managed by two separate staffs, milking twelve cows at a time on the one farm, eight at a time on the other. I have thus been having experience in duplicate form, and, having been for years in the habit of keeping an accurate note of the milk brought from the out farm, I am in a position to compare results with years of hand-milking. Taking the year ending 15th November last, and comparing it with the out-turn of 1904, with the same number of cows milking, viz., fifty, and fed, and treated in pretty much the same manner, I find there is a balance in favour of the machine period of 187 gallons. When I compare the average of the four years before 1904, the balance is 196 gallons. This is not very much per cow if spread over twelve months, but it is on the right side. I am not able to give such accurate figures for Huntly, as for a time some were milked by hand, and the milk was all totalled together, but I can compare the out-turn of butter during twelve months of machine milking and twelve months of milking by hand, and here again the out-turn is slightly in favour of the machine period. When I made my calculations previous to ordering an installation, I did so on the supposition that possibly the machine might do almost as well as hand-milking, but the result has bettered my expectation. Then, I find another point gradually coming into prominence. The cows

ACTUALLY THRIVE BETTER

when machine milked. Almost all take kindly to it from the very first. It is so regular and gentle in its action that even the most nervous cow soon forgets her nerves. The cow knows exactly what to expect when the machine is set agoing at her teats, but it would be a very knowing cow that could tell beforehand what to expect from a band of hand-milkers, especially if there had been some quarrel in the kitchen or on the way to the byres. Of course, with two separate installations, rendered necessary by the distance between the farm steadings, I am not favourably placed for working with the utmost economy. I have two engines to keep going where one could suffice, and I have one operator and one stripper more than would be necessary if all the stock were housed together, but my experience enables me to see that three operators, working nine machines, and two strippers, would easily milk 150 cows in an hour and a half. There is thus a saving of ten milkers. Against this, my coal account for the year is £15 more, and repairs and renewals total £8 7s., so that there is a very large balance to make good depreciation of plant and meet the interest on the first cost. A discussion followed.

Mr. Gilmour, Alderston, Bellahill, said that if a man was to keep a dairy stock successfully he must attend to the housing, feeding, milking, and general management himself. Personally his dairy paid better than any other branch of his farming.

Mr. Robt. Wilson, Manswraes, said he did not know much about milking machines, but he knew that cows well milked were very much more remunerative than those that were badly milked. He was satisfied that both the health of cows and their produce were improved by giving salt in the fields.

Mr. Jas. M'Adam, Craigley, Castle-Douglas, would have liked Mr. Millar to have described the best type of a dairy cow. He thought that the shelter of trees and hedges in summer produced weeds in cows' udders. He would like to hear Mr. Millar's remedy for cows running about in the heat of the day in summer.

Mr. Wm. Stewart, Milton, Duntocher, said that in the west of Scotland they could not have their cows out seven months of the year. He corroborated from experience what Mr. Millar had said in regard to the Lawrence-Kennedy milking machine. It did its work quietly and well, and if properly looked after was a thorough success. A girl newly left the school could work it. If a pure milk supply was to solve the question of infant mortality, such a supply must come through the milking machine.

Mr. Jas. Stirling, manager of the Glasgow Dairy Co., said he would have liked to have heard a little more of the milking machine. It seemed to be a success where the master or the mistress took an individual interest in it, but in the hands of indifferent servants the results were not so satisfactory. He was glad to hear, after years of complaining, farmers candidly confessing that dairying was the best paying subject they had.

Mr. Sillars, Fenwick, did not think many farmers would say that dairying paid well. What they said was that there was nothing else paying. Would many of the prominent Glasgow dairymen present that evening be content to do the same work that the dairy farmer did for the same remuneration? They all welcomed the good news about the milking machine, but he would like to be told how bad Mr. Millar's hand-milkers were in order to compare their work with that of the machine.

Mr. John M'Caig, Stranraer, approved of giving salt to stock in summer as well as in winter. He agreed with Mr. M'Adam as to the risk of shelter. He gave his stock a wash of M'Dougall or some other safe dip along the spine, and this ensured perfect security from clegs and other insect pests. He did not know much about the milking machine, but was not sure that he would view its introduction as an unmixed blessing if it was going to put the old women aside.

Mr. Taylor, V.S., Cathkin, condemned the system of hawking young cows at the drop through the auction marts. If farmers had more house room they would not buy cows at the drop so extensively as they did.

Mr. J. Wyllie, Knowewart, wished to know if queys took readily to the milking machine. It would not do on wet land to feed green stuff to cows in the field, as it would get spoiled by potching.

Mr. R. Wilson, Dunlop, advocated the keeping of milk records. In his own case a record kept for a year had shown that they had cows giving as much as £30, and one as low as £7 10s. per annum, and all fed and cared for in the same way. The keeping of a record would stimulate a man to improve his stock, and, if possible, do better the next year than he had done during the previous one.

Mr. Spier, Newton, agreed with the lecturer as to the use of an

Aberdeen-Angus bull with Ayrshire cows where they were not breeding stock to rear themselves. He would advise all farmers within a radius of ten or fifteen miles of Glasgow who were not raising their own stock to use an Aberdeen-Angus bull. He did not see that the Lawrence-Kennedy milker milked a bit cleaner than the Murchland one. They should not attach too much importance to increased yields from the cows with machines, as the yield might have been affected by a variety of other circumstances.

Mr. Dunlop, Midlands, said the time they needed a good catch crop was in spring. He had tried sowing rye in September, and he believed it would do. He had a neighbour who tried green beans to his cows, but lost two of the best, and stopped it.

The Chairman said there was always room at the top for the best butter and cheese. He was under the impression that their cows were not so good as they were thirty years ago. The commercial, the dairyman's, and the show cow should all be one and the same animal. The secret of the popularity of Danish butter was that it could be got all the year round, and of the same flavour. In spite of the extra cost of feeding, dairying should pay as well in the winter as in the summer.

Mr. Millar, in reply, said he was thoroughly convinced that winter dairying did not pay. If it were not for the profits of the summer time he could not make it pay in winter. He was not of opinion that cows were better thirty years ago than now. He grew seven to ten acres of green beans every year, and he had never lost a cow by feeding with them, nor had any trouble. There was nothing produced more milk or butter than beans. In his district they were favourably situated as to grass in spring. The month of July, and perhaps the first fortnight of August, was their worst grazing period. It was then he found the supplementary food, such as rye and green hay, and then beans, useful. He was pleased to find that the milking machine gave an increased yield, although it was a small one. He did not think that his hand-milkers were worse than those of his neighbours. His dairymaid found that the Murchland machine was difficult to keep clean. There were ninety parts that had to be taken down twice a day and cleaned. With the Lawrence-Kennedy cold water and then hot were run through the pipes, and they did not get tainted. The cows never resented the Lawrence-Kennedy from the first. They had never been beat with any cow, nor had they any expense from machines being damaged or broken. He did not want them to follow Mr. Spier's advice as to using an Aberdeen-Angus bull, because the produce would likely find its way north, and lower his returns. He could not keep a milk record, because the machine milked two cows into one can. He had never experienced any difficulty in milking queys with the machine; in fact, they were easier handled than cows which had been accustomed to hand-milking. They had to have strippers after the machine, but they had to have that with hand-milkers. A person of average intelligence could work the machine. The term changes had less terrors for him now than formerly. **His practice was to house his cows in the heat of the day in summer, as they were out all night. When they were tied by the neck they did not gallop. (Laughter.)**

Votes of thanks to the lecturer and the chairman terminated the proceedings.

Veterinary Departmental Reports for Month of December, 1906.

ABSTRACTS FROM REPORTS.

MINISTER OF AGRICULTURE,—

Sir,—I have the honour to forward my monthly report for December, 1906, also those of the District Veterinary Surgeons and Stock Inspectors.

Sheep Scab.—There have been seven fresh outbreaks of this disease and 43 licenses raised.

Lungsickness.—Two fresh outbreaks occurred during the month, one in the Newcastle district and the other in the Dundee district.

Glanders.—One animal destroyed in the Utrecht district and two in Zululand.

Horsesickness.—Fifty-seven deaths reported as under:—

Vryheid	4
Umvoti	3
Utrecht	2
Weenen	2
Alexandra and Harding	5
Dundee	1
Durban	19
Upper Unkomanzi	1
Eshowe	4
Melmoth	2
Nongoma	7
Pulpietersburg	2
Mahlabatini	3
Umlalazi	1
Maritzburg	1
Total	57

East Coast Fever.—During the month the following outbreaks occurred:—

Lower Tugela and Mapumulo	2
Inanda	1
Vryheid and Ngotshe	5
Durban County	4
Paulpietersburg	1
Zululand	2
Total	15

The following deaths are reported from East Coast Fever:-

Lower Tagela and Mapumulo	115
Vryheid and Ngotshe	290
Alexandra County	4
Dundee	5
Durban County	42
Zululand	479
Paulpietersburg	4

Total	939
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With reference to East Coast Fever, it would appear that there are still many who will not realise the difference between East Coast Fever and ordinary Redwater or Texas Fever, and there are some apparently who still maintain that the two diseases are identical.

East Coast Fever and ordinary Redwater or Texas Fever are two distinct diseases, caused by separate and distinct parasites. Clinically and on *post-mortem* the symptoms and lesions are very identical, as is the case with all diseases caused by protozoic organisms affecting the blood. The different characters between East Coast Fever and ordinary Redwater or Texas Fever are briefly as follows:—

ORDINARY REDWATER OR TEXAS FEVER.

1. Communicated by the common tick (*Rhipicephalus decoloratus*), and transmitted through the egg stage.

2. The disease can be communicated from one animal to another by blood inoculation.

3. The chief action of the parasite is to break up the red blood cells, and in consequence we have marked anaemia and frequently red urine.

4. A recovered animal is only immune while exposed to infected veld.

5. A recovered animal while exposed to infected veld carries the parasite constantly in its blood, and its blood is constantly virulent and maintains the infection through the ticks.

6. Animals immuned to ordinary Redwater or Texas Fever are entirely susceptible to East Coast Fever.

EAST COAST FEVER.

1. Communicated by the Brown tick (*Rhipicephalus appendiculatus*), Black pitted tick and others, but not by the common Blue tick, and the infection is not transmitted through the egg stage.

2. The disease cannot be communicated from one animal to another by blood inoculation.

3. The parasite does not break up the red blood cells; there is no anaemia and no discoloured urine, unless double infection or ordinary Redwater and East Coast Fever exist at one time.

4. A recovered animal is immune for life.

5. Recovered animals do not carry parasites in their blood, the blood is not virulent and does not maintain the infection through the ticks.

MICROSCOPICAL DIFFERENCES.**ORDINARY REDWATER OR TEXAS
FEVER.****EAST COAST FEVER.**

Parasites of ordinary Redwater in their typical form are large pear-shaped bodies in pairs within the blood corpuscles, and it is usually found that not more than 30 per cent. of the corpuscles contain the parasites. In recovered or immuned animals these parasites do appear as rod-shaped or oval bodies resembling the East Coast Fever parasite, but they are never numerous.

The parasites are small rod-shaped bodies within the blood cells frequently three or four parasites irregularly placed in one cell, and in typical advanced cases of the disease 90 to 100 per cent. of the corpuscles may contain these parasites.

It is hoped that all interested in the welfare of Natal will accept that there is a new disease existing in several parts of the Colony in the form of East Coast Fever, and I would earnestly appeal to the cattle-owners of the Colony to consider the position and do their utmost to dispel the apathy and unbelief which exists in many quarters. We can understand the natives' mind being unable to grasp all the facts concerning East Coast Fever, but we are entitled to expect that the white population of Natal as a whole will realise that we are faced with a new disease, and that by taking practical precautions to protect their cattle will set a good example to the natives.

The first step necessary is for all to realise we are faced with a serious disease. The greatest disadvantage we labour under in our endeavour to combat the disease is the attitude of those who will not learn until they have had actual experience to their own cost. If East Coast Fever spreads generally throughout Natal, and at the present time the position is very unsatisfactory, that section of the community who will not believe we are faced with a new and serious trouble will undoubtedly have contributed their share towards its spread. It is recognised by all that one of the chief obstacles in combating any stock disease in this Colony is the fact that we have a large native population carrying on, as their chief livelihood, cattle-breeding, but it is regrettable to note that this obstacle is greatly magnified by the attitude of individuals who treat the matter with ridicule, and behave, in so far as their cattle are concerned, as if no danger exists. Even individuals, who claim to have considerable influence with the natives, and other cattle-owners, have preached the doctrine that East Coast Fever does not and never has existed, and in many cases we have been compelled, with a view to removing this opinion, to allow the cattle of such people to die out in order to prove definitely the mortality which attends this disease, and also to allow them to try every remedy which can be imagined, with the known result of failure. It is true that when anyone has had actual experience he knows with certainty the result of East Coast Fever, but it is also true that it is those who have had no experience who oppose the existence of the disease and the necessary steps taken to prevent its spread.

East Coast Fever is undoubtedly the most treacherous and insidious disease which has ever visited South Africa, and its effects are the most certain, and I am positive of what the result will be unless the European population as a whole are prepared to face the hard practical facts before them at the present moment. As previously stated, we realise we have to face ignorance and apathy on the part of the natives, but if we have also to meet this on the part of a certain section of the European population the position will become hopeless, except as regards those stock-owners who will protect themselves by realising the facts before them. Those who hold that no East Coast Fever exists in Natal, or that ordinary Redwater and East Coast Fever are identical, are a menace to the welfare of the stock-owners of this Colony.

The present position as regards East Coast Fever is most serious, and the experience of the last three or four months has proved to us that not the least danger tending towards its spread is the apathy and indifference displayed from many sources, and I feel it my duty in consequence to write in the strain I have as a warning to the public. All who have followed the course of this disease know the opposition we met with in dealing with it in the Vryheid district, but, in fairness to that district, their opposition has been no greater than that offered in some of the districts of Natal to the regulations necessary in preventing its spread.

We who have studied this disease, and watched every detail of its progress, and also profited by the experience gained in other Colonies, know what the end will be if, in our efforts, we have not the full support and co-operation of every section of the farming community. It is fortunate, as shown by the work done by the several committees, and the results of the meetings held with reference to East Coast Fever throughout the Colony, that the greater proportion of the farming community do realise the seriousness of the position, but it is also true that those who will not realise what is before them are the people who appear to bring their views to the greatest prominence.

S. B. WOOLLATT,
Principal Veterinary Surgeon.

STANGER.—D.V.S. DONALDSON.

East Coast Fever.—The total number of deaths reported is 115. Two new outbreaks; one at James Umfrow's, at Junction, Glendale, Mapumulo Road, and one at Sinkwazi's, near Darnall, amongst Indians' cattle. 214 cattle and 12 calves have been sent to Umhlatusan. 329 cattle and 63 calves have been sent with D.V.S. Hutchinson to the Rand.

Otimati Camps.—No 2 Camp (the loot stock) has been closed. No. 3 Camp will in a few days also be closed, as the cattle will be handed back to their owners.

No. 1 Camp (Transport).—I am writing you a separate report, attached.

Nonoti Camps.—The cattle at these camps are healthy, and no disease has appeared during the month.

Mapumulo.—The disease is very bad in this part, and it is impossible to state the total number of deaths; in many cases whole herds of natives' cattle have died.

Tongaat.—E.C.F. has broken out in the village amongst Indians' cattle. Eighteen cattle went to Umhlatuzan on 31st December. More are being railed.

LADYSMITH.—D.V.S. WEBB.

Scab.—Three flocks under license in Ladysmith district; none under license in Bergville district.

Mange in Goats.—This disease is very prevalent amongst the flocks owned by natives in both districts.

East Coast Fever.—None exists in either district.

Horsesickness.—No cases have been reported.

Fractured Radius.—The thoroughbred entire recently purchased by Mr. A. W. Illing had the misfortune to fracture the radius just above the knee. I tried to fix a special splint and place the horse in slings, but the horse strongly objected to both. Mr. Illing was loth to destroy the horse so turned him on the veld. Ten days after the accident the bone had penetrated through the skin, and it was apparent that no chance of recovery existed. As an experiment, I placed the horse under chloroform and amputated the leg, but the horse died the same night, apparently from surgical shock.

VRYHEID.—D.V.S. BECKER.

Horsesickness.—Four cases of this disease have come under my notice this month. It is anticipated that the mortality from this cause is likely to be heavy this season.

Scab.—Three licenses have been raised during the month, and one flock reported as still under license.

East Coast Fever.—Mortality amongst cattle has been fairly heavy, and a number of deaths, particularly amongst native cattle, have not been reported. The returns given are therefore only approximate (290), and I am of opinion that they err by being, if anything, too moderate. Five fresh centres of infection have been noted during the current month, and the progress of the disease, if steady, is none the less sure and certain. Babanango still appears clean, and it is to be hoped that if the quarantine line is rigidly enforced East Coast Fever will not break out there. The great danger lies in possible infection prior to the formation of this quarantine; as far as we can see at present this is not the case. A number of cattle left the district for slaughter purposes during the month.

GREYTOWN.—D.V.S. CORDY.

Scab.—Six fresh outbreaks have occurred.

Glanders.—A clinical case of this disease having occurred among mules working between Greytown and some gold mines over the Ngobevu Drift, in Zululand, I tested three spans of these animals, thirty in all, before they returned to Maritzburg. None of these showed any reaction.

East Coast Fever.—At the end of the month suspicious cases of this disease occurred on Mr. Edwards' farm, on the Greytown-Muden Road, and about six miles from the site of the Mudén outbreak. The cattle have been placed in strict quarantine until the nature of the disease has been definitely proved.

It has been necessary to place the cattle of Mr. John Keyter, of Frogmore, Krantzkop district, in quarantine owing to the owner not complying with the Regulations. As East Coast Fever was in such close proximity to the Krantzkop-Mapumulo boundary, it was not considered safe to allow wagons to travel nearer the boundary than the foot of Balconub's Hill. In spite of having been informed in writing as to these Regulations, one of Mr. Keyter's wagons was sent to the top of the hill and there outspanned.

It is much to be regretted that so large a stock-owner should take up such an attitude, as, unless the Department receives the co-operation of the farmers in trying to prevent the spread of East Coast Fever, the task would appear to be almost a hopeless one.

Horsesickness.—Three mules are reported to have died from this disease, probably contracted through working in the Thorns.

Six mule wagons are now being run by the Department between Greytown and Mudén, and as they have recently been doing three trips a week the accumulation of produce at Mudén should soon be considerably lessened.

NEWCASTLE.—D.V.S. McNEIL.

Sheep Scab.—I am glad to say that there are no cases of Scab in the Newcastle district and only one continued outbreak is present in the Utrecht district.

Mange affecting Goats.—Seven licenses were raised during the month.

Glanders.—One animal was destroyed during the month. This case was continued from the previous month owing to the reaction not being decided in character.

Lungsickness.—One outbreak occurred during the month. An "old lunger" from a previous outbreak was the victim. I inspected the lung on *post-mortem*. The farm is in strict quarantine, and there have been no further deaths.

Contagious Pleuro-pneumonia of Goats.—During the past month an extensive outbreak of the above disease appeared in this district, happily confined to a single flock, and causing the death of eighty goats and kids.

This disease very much simulates Lung-sickness affecting cattle in the general appearances of the animals during life and on *post-mortem* examination. As in the case of bovine pleuro-pneumonia, a certain proportion make a recovery, and the history of the outbreak leads me to infer that this outbreak was occasioned by the breaking down of an encapsuled previously diseased portion of lung tissue. Medicines are of no avail in the treatment of the disease; segregation of the diseased animals from the healthy gives good results.

MOOI RIVER.—D.V.S. VERNEY.

Horsesickness has occurred in the Weenen Division, two horses having succumbed from this malady. There is every prospect of a bad season in this respect.

East Coast Fever.—During the month no fresh outbreaks have occurred, although there had been several deaths amongst cattle in and near Muden, but the majority of these had been due to eating poison, such as young Amakla plants, etc. The main fencing of the infected area at Rotteher's is now completed, and it only remains to fence portions of the Mooi River that cattle could get through when the river is low. Grass is very bad at the Crown lands where cattle in temperature camp graze, the result of want of rain. Tick life is becoming very active in the thorn veld now, and I anticipate if there are any more infected areas we shall soon get evidence of them; and it is very important that stock-owners should send slides from all animals sick or dead.

Biliary Fever.—An imported thoroughbred came under my treatment for Biliary Fever. This animal was in a very critical condition, but I am pleased to say he has made a good recovery.

DURBAN.—D.V.S. AMOS.

The importations by sea have been as follows:—

Sheep, 1,041 ewes, 130 rams	1,171
Mules	559
Donkeys	254
Horses	157
Dogs	21
Pigs	6
Rabbits	4
Deer	4
Goats	2

Total 2,178

All the sheep came from Australia. The mules, donkeys, and 41 horses came from Argentine. 106 horses came from Australia, and the remainder from England. The dogs and pigs came from England. The deer from India, and the goats from Cape Colony.

Horsesickness has been fairly prevalent, and some 19 cases have come to my notice.

East Coast Fever.—This disease has been held in check, and the four fresh outbreaks that occurred during the month were all well inside the infected area. Forty-two deaths took place from the disease, 36 were killed with high temperatures, and 164 were removed for slaughter purposes. Those who sold their cattle for slaughter within the area acted very wisely, and it is a great pity the scheme is not to be continuous, for it undoubtedly is the only chance of obtaining any finality with the disease, and the Colony would have been opened to free movement again all the sooner, which at present seems to be too far off to even think of. Many people still try to persuade themselves the disease is anything else but East Coast Fever, which is most extraordinary after the object lessons which anyone could see who wished to in more than one outbreak in this county. The special quarantined area is now well flagged and guarded, and I hope sincerely our efforts will keep the disease within it.

ALEXANDRA AND ALFRED.—D.V.S. TYLER.

East Coast Fever.—The outbreak of East Coast Fever in Alexandra County has been dealt with, and the cattle have been returned to their owners after passing through two test camps. The fence around the infected area is almost completed, and I do not think we need be afraid of any extension of the disease from this centre. The quarantine regulations are, of course, still being maintained, and are being loyally observed by the residents.

Horsesickness.—Several deaths have occurred from this disease, and there is every indication of a bad year before us.

Fruit Culture.

SPEECH BY THE MINISTER OF AGRICULTURE.

On the 19th inst., at the Annual Meeting of the Pinetown Horticultural Society, the Minister of Agriculture, in the course of a short speech, said that horticulture had now arrived at a very important stage in the Colony, inasmuch as they were now able to produce fruit more than enough for local requirements, while distant markets were practically unworked. It would interest those of them who were fruit-growers to know that the annual value of the Natal fruit crop was £150,000. That value could be exceeded by careful selection, and it was their duty to look into the matter very closely. They were aware that next month the South African Produce Exhibition would be opened in London, and at that Exhibition one of the most important exhibits would be from Natal. In fact, he might say that the Natal exhibit was between 60 and 70 tons measurement of pineapples, and each pineapple would weigh not less than 2lb., while the price would be such as to force a sale. He hoped the result of that would be that between Natal and London a trade in fruit would spring up, and that the culture of pineapples would be extended. The Government had, within the last few years, paid great attention to horticulture. It had experimental orchards at Cedara,

Weenen, and Winkel Spruit. At Cedara, experiments were being carried out in the culture of up-country fruits, and there the methods adopted for cultivation, manuring, pruning, and the warring against insects had proved very successful. At Weenen they were also experimenting, and paying great attention to irrigation, and on the coast, at Winkel Spruit, all the varieties of coast fruits were being experimented with. At Winkel Spruit an addition had been made of the St. Michael pine, and also of a banana, which at the present time was creating a great deal of interest in London. The Government had on all occasions sent officers to the various fruit-growing centres to advise fruit-growers in all manner of things pertaining to fruit culture, and last year consignments of fruit were being collected and sent to London, free of cost, and won medals. That showed that their fruit was of good quality, and what they wished to arrive at now was to send fruit to the Home market, not in sample, but in bulk. A complaint which recently had become an actual grievance, was that the fruit was sent up-country in iron trucks. That grievance was now one of the past. At the show they naturally staged only the best fruit, and he hoped that they would bear that in mind when they were sending fruit to market, and send only the best quality for disposal. Let them get a good name from the start, for the smaller fruit could be used up as pulp or jam, for which also there was a big opening. In conclusion, he said that the show had been a surprise; he had expected a small show, and instead found a large one of excellent exhibits. He declared the show open.

District Report.

WEENEN, 20th January.—There has, unfortunately, been another outbreak of East Coast Fever at Muden, this time on the farm Sutherland. Seven head are reported to have died within the last three weeks, and the owners failed to report the matter. As this outbreak is within the previously proclaimed sub-quarantine area, it is hoped that it will be confined to this district. Locusts have been laying eggs throughout certain portions of the Division. A large number of eggs deposited on low-lying fields are reported to have been destroyed by Mr. Rottcher, who flooded the land for this purpose. Isolated cases of Horsesickness have occurred. A horse belonging to a local volunteer succumbed two days after it was insured. After a period of scorching sun for a few weeks, good rains have fallen, which will be the salvation of some of the crops. Fruit is backward this year, and the supply does not promise to be plentiful.

C. G. JACKSON, Magistrate.

Manures of 1906.

* In the manure list given on pages 1,208 and 1,209 of last month's *Journal* an unfortunate error occurred with regard to No. 42 Potato Fertiliser sold by the South African Fertiliser Coy. The figures should read Nitrogen 4.05 per cent., instead of 3.75; the estimated value of the Nitrogen is £3 1s. 7d., and the total estimated value of the manure should read £7 3s. 8d., instead of £6 16s. 9d. In the list re-published in this issue the error has been corrected.

A. PARDY, Analyst.

130	0 15 10	10 05	2 16	1	4 29	0 17 11	2 61	0 7 2	16 95	4 1 2	Fineness of Bone Dust and Slag per cent.	4 17 0	6 0 0b
140	0 17 1	12 10	3 7 7	0 75	10 12	2 2 2	2 30	0 6 4	15 15	3 17 1		4 14 4	5 17 6a
078	0 9 8	12 00	3 7 0	0 27	10 16	2 2 4	0 92	0 2 6	13 19	3 10 8		4 0 4	6 0 0c
130	0 15 6	9 21	2 11 5	1 68	4 05	0 7 0	3 26	0 9 0	14 15	3 7 5	Fine. Med. Crse.	4 2 11	6 0 0g
076	0 8 9	...	...	...	8 65	2 2 2	24 78	3 8 2	34 90	5 10 4		5 19 1	9 14 2h
121	0 13 11	...	...	...	4 05	2 2 4	21 84	3 0 1	32 00	5 2 5		5 16 4	5 10 0b
117	0 13 5	...	...	...	4 05	1 16 1	23 55	3 4 9	32 20	5 0 10	Fineness of Bone Dust and Slag per cent.	5 14 3	5 9 6c
398	2 5 9 4	...	...	...	3 66	0 16 11	19 60	2 13 11	23 65	3 10 10		5 16 7	6 0 0b
420	2 8 4	...	...	...	4 38	0 15 3	19 11	2 12 7	22 77	3 7 10		5 16 2	5 19 7i
381	2 3 10	...	...	...	5 87	0 18 3	17 97	2 9 5	22 35	3 7 8	Fine. Med. Crse.	5 11 6	5 14 2j
355	2 0 10	...	...	...	13 13	1 4 6	14 82	2 0 9	20 69	3 5 3		5 6 1	6 4 2h
...	...	...	...	...	12 10	3 5 8	7 23	1 7 1	20 36	4 12 9		4 12 9	4 10 0b
...	...	...	...	...	9 60	2 0 6	6 05	1 2 8	18 15	4 3 2	Over 80 per ct. fine	4 3 2	3 15 6a
...	...	...	...	...	4 15	1 0 9	9 11	1 14 2	13 00	3 0 9		3 0 9	3 16 0e
...	...	...	...	...	...	...	...	...	13 26	2 14 11		2 14 11	3 10 0b
Potassic Chloride (Muriate)	...	...	...	...	...	...	...	...	...	...	Fineness of Bone Dust and Slag per cent.	13 13 4	13 10 0b
of Potash	...	...	...	...	...	...	...	...	...	...		13 10 10	13 15 0a
Sulphate of Potash	...	...	...	...	...	...	...	...	...	...		13 11 6	13 15 0a
do.	...	...	...	...	...	...	...	...	...	...	Fine. Med. Crse.	12 11 6	13 10 0b
do.	...	...	...	...	...	...	...	...	...	...		12 11 6	13 10 0b
Nitrate of Potash	...	...	...	...	...	...	...	...	...	...		12 11 6	13 10 0b
Kainit	...	...	...	...	...	...	...	...	...	...	Fineness of Bone Dust and Slag per cent.	12 11 6	13 10 0b
Complete	...	...	...	...	...	...	...	...	...	...		12 11 6	13 10 0b
Potato Fertilizer	...	...	...	...	...	...	...	...	...	...		12 11 6	13 10 0b
do.	...	...	...	...	...	...	...	...	...	...	Fine. Med. Crse.	12 11 6	13 10 0b
do.	...	...	...	...	...	...	...	...	...	...		12 11 6	13 10 0b
Camp Refuse	...	...	...	...	...	...	...	...	...	...		12 11 6	13 10 0b
Marvel Fertilizer	...	...	...	...	...	...	...	...	...	...	Fineness of Bone Dust and Slag per cent.	12 11 6	13 10 0b
E & O.E.	...	...	...	...	...	...	...	...	...	...		12 11 6	13 10 0b
...	...	...	...	...	...	...	...	...	...	...		12 11 6	13 10 0b

a Henwood, Son, Soutter & Co. b South African Fertilizers Co. c F. and G. Reiche, d W. Dunn & Co. e J. Raw & Co. f Natal Chemical Syndicate, Ltd. g B. Westall & Co., Mooi River. h Geo. Telfer. i P. D. Clark, Mooi River. j H. C. Foss & Co. k Steel, Murray & Co.

ALEX. PARDY, F.O.S., &c., Analyst.

Cedara, December, 1906.

Meteorological Returns.

Meteorological Observations taken at Government Stations for Month of December, 1906.

STATIONS.	TEMPERATURE (IN FAHR. DEGS.).				RAINFALL (IN INCHES).					
	Means for Month.		Maximum for Month.	Minimum for Month.	Total for Month.	No. of Days.	Heaviest rain-fall in 1 day.		Total for Year from July 1st, 1906.	Total for same period from July 1st, 1905.
	Maximum	Minimum					Fall.	Day.		
Observatory ..	81.5	66.0	89.3	60.3	6.96	19	2.12	20th	21.87	18.14
Stanger ..	85.0	64.8	103	54	4.24	23	2.25	14th	21.99	19.62
Verulam ..	91.0	66.6	105	60	3.86	10	1.5	14th	16.83	15.93
Greytown ..	87.2	48.3	100	36	3.05	13	.70	14th	14.61	15.73
Newcastle ..	84.5	58.0	98	45	7.85	11	2.30	26th	23.74	14.54
Ndwedwe ..	78.9	62.7	92	56	4.80	15	1.35	15th	20.56	21.16
Batcourt ..	86.0	..	100	..	3.85	7	1.50	15th	11.86	9.86
Mid-Illovo ..	78.0	59.2	101	52	6.18	18	1.25	15th	20.63	14.25
Impendhle ..	75.3	50.7	85	41	4.13	17	1.14	28th	16.15	..
Port Shepstone ..	81.6	61.2	92	55	7.66	12	1.40	23rd	22.07	24.19
Umzinto ..	84.0	52.9	90	50	5.14	11	1.21	28th	23.37	20.60
Richmond ..	78.5	56.9	93	48	6.82	12	1.38	14th	19.68	17.21
Maritzburg ..	81.4	58.8	96	51	5.25	12	1.76	14th	21.22	13.05
Howick ..	79.4	55.7	92	47	3.78	14	1.71	14th	18.89	12.86
Dundee ..	80.7	60.7	92	52	5.40	14	.41	16th	16.79	9.11
Weenen Gaol ..	94.9	59.5	102	52	1.90	10	.53	14th	11.47	12.85
Charlestown ..	76.5	50.0	84	35	8.40	17	3.84	29th	23.67	..
New Hanover ..	85.9	57.5	97	51	2.73	13	.90	14th	22.53	16.51
Nqutu ..	81.1	57.9	88	47	3.23	9	1.18	12th	..	11.60
Nongoma ..	79.9	49.5	89	39	6.18	8	1.40	25th	22.04	14.93
Umlalazi ..	75.5	49.4	100	35	6.0	8	2.30	18th	..	18.79
Hiabisa ..	80.5	59.3	96	50	6.03	6	2.00	26th	24.13	17.41
Melmoth ..	82.1	60.2	91	52	5.28	15	.91	16th	20.64	12.02
Ubono ..	80.2	61.0	94	53	7.22	9	2.55	28th	27.91	..
Amatikulu ..	86.5	64.6	105	59	2.80	15	1.17	12th	15.91	..
Point ..	..	..	..	..	6.06	13	2.65	28th	22.63	18.38
Empangeni ..	..	..	..	..	3.50	7	1.11	27th	19.72	19.40
Maritzburg (Burger St.) ..	..	..	..	..	5.45	15	1.81	16th	20.71	..

Meteorological Observations taken at Private Stations for Month of December, 1907.

STATIONS.	TEMPERATURE (in Fahr. Degrees.)		RAINFALL (in inches).					
	Maximum for Month.	Minimum for Month.	Total for Month.	No. of days.	Heaviest Rain-fall in one day.		Total for Year from July 1st, 1906.	Total for same period from July 1st, 1905.
					Fall.	Day.		
Central Experiment Farm, Hill (Mangr.) ..	92	49	3.71	10	1.13	14th	18.54	10.80
Experiment Farm, Weenen (Manager) ..	99	48	2.02	9	.69	15th	12.32	16.06
Experiment Farm (Winkel Spruit) (Mgr.) ..	89	54	7.93	18	2.58	15th	22.77	22.84
Nottingham Road (C. J. King) ..	..	..	4.87	14	.75	14th	22.90	16.74
Adamshurst (Wm. Adams) ..	88	51	3.72	14	1.34	14th	15.93	9.88
Hilton (W. Engel) ..	88	46	3.90	16	1.83	14th	21.24	14.79
P.M.B., Town Bush Valley ..	..	..	5.85	14	1.75	14th	26.45	18.38
Mid-Illovo (A. N. Montgomery) ..	101	54	6.18	17	1.25	15th	20.63	14.25
Ottawa ..	..	..	3.09	12	1.18	15th	19.32	16.85
Mount Edgcombe (Natal Estates) ..	98	58	7.24	15	1.66	22nd	24.10	17.18
Corasbia (G. Wilkinson) ..	..	..	5.27	..	..	..	26.13	15.29
Milkwood Kraal ..	..	..	5.55	..	..	..	18.97	8.93
Blackburn ..	..	..	5.82	..	..	..	19.17	13.17
Saccharine ..	..	..	5.98	..	..	..	20.62	1.75
Equestria (W. Hawke) ..	102	62	5.05	18	.78	15th	26.82	19.72
Umzinto, Benava (E. W. Hawke) ..	..	..	4.97	12	0.86	14th	26.32	17.88
Brankholme (Charles Scott) ..	..	..	6.08	15	1.02	27th	31.11	19.09
Impendhle (H. Hill) ..	89	39	6.96	16	1.91	28th	22.45	17.26
Riet Vlei (P. Otto, J.P.) ..	..	..	3.40	13	.83	15th	18.93	..
Dalton (J. Protenhauer) ..	..	..	3.97	13	1.12	14th	17.27	..

Coal and Labour Return.

Return of Coal raised and Labour employed at the Natal Collieries for the month of December, 1906:—

Name of Colliery.	Labour Employed.						Unproductive Work.*			Output.
	Above Ground.			Below Ground.						
	E.	N.	I.	E.	N.	I.	E.	N.	I.	Tons. Cwt.
Natal Navigation ..	29	81	258	19	251	186	4	9	—	16,2 3 5
Glencoe, Natal ..	20	120	89	14	498	7	—	—	—	16,261 15
Klandslaagte ..	18	22	240	16	230	450	10	23	34	14,842 17
Durban Navigation ..	10	149	59	12	308	52	—	10	—	12,411 —
South African ..	7	30	65	10	200	75	5	29	38	8,630 1
Natal Cambrian ..	16	33	120	12	200	71	—	—	—	7,254 15
Newcastle ..	10	40	25	9	239	3	3	6	—	7,133 6
Dundee Coal Co. ..	8	11	140	6	28	257	14	21	199	6,95 3
St. George's ..	16	51	164	10	180	109	1	6	—	6,304 —
West Lennoxton ..	5	1	63	2	31	95	—	—	—	2,625 —
Natal Steam Coal ..	2	40	3	2	106	3	2	5	2	2,015 4
Ramsay ..	1	5	55	3	45	104	4	10	25	1,559 —
Talana (Natal) ..	3	8	12	1	30	32	2	3	3	1,264 5
Zululand ..	2	48	—	2	58	—	3	5	—	1,000 —
Woodlands ..	1	6	5	2	7	9	—	—	—	60 —
Signal Hill ..	—	—	—	—	—	—	1	3	—	32 —
Nooitgedacht ..	—	2	—	1	2	—	—	—	—	6 —
Totals	157	647	1,300	121	2,463	1,455	49	135	301	104,571 11
Corresponding month, '05	136	565	976	115	1,920	1,237	45	214	181	88,944 14

* Cost charged to Capital Account.

Maritzburg,
7th January, 1907.

CHAS. J. GRAY,
Commissioner of Mines.

Return of Coal bunkered and exported from the Port of Durban for the month of December, 1906:—

	Tons.	Cwt.
Coal Bunkered	38,965	5
Exported to:—		
Port St. John's	8	0
East London	1,491	2
Algoa Bay	4,942	19
Mossel Bay	10	0
Cape Town	18,824	6
Port Pirie	1,004	10
Mauritius	115	5
Total	65,361	7

Custom House, Port Natal,
5th January, 1907.

(Signed) GEO. MAYSTON,
Collector of Customs.

A good harness wax can be made with the following ingredients: Turpentine oil, 900 parts; yellow wax, 90 parts; Prussian blue, 10 parts; indigo, 5 parts; bone black, 50 parts. Dissolve the wax in the oil by the aid of a low heat in a water bath. Mix the remaining ingredients, which must be well powdered, and work up with a portion of the solution of wax. Finally add the mixture to the solution, and mix thoroughly in the bath. When a homogeneous liquid is got, pour into earthen boxes.

Return of Farms at Present under Licence for Lungslckness and Scab.

STOCK INSPECTOR.	DISTRICT.	DISEASE.	OWNER.	FARM.
A. H. Ball ..	Weenen	Scab	J. P. Lotter ..	Berg VI it
		"	Gundane ..	Gretua Green
A. P. Craw ..	Ladysmith ..	"	Inkinshi & Others..	Bell Vue
		"	A. W. Illing ..	Minita's
L. Trenor ..	Harding ..	"	Gengen ..	Roo-deport
J. R. Cooper ..	Nkandha & Ngutu	"	Maholua ..	
		"	M. Modweni ..	Dalalu
		"	B. Butelezi ..	"
		"	B. Ndhlovu ..	"
		"	M. Ndhlovu ..	"
		"	C. Sekosana ..	"
		Lung-sickness	N. Gobose ..	Matogato
		Scab	M. Gobose ..	Lower Blood River
		"	S. Zungu ..	Delala
		"	S. O. Molife ..	Telezi
		"	D. Ndhlovu ..	"
		"	M. Setole ..	Delala
		"	M. Mgune ..	Blood River
		Lung-sickness	S. Sebese ..	Nqutu Hill
S. A. Brown ..	Underberg ..	Scab	J. A. Stone ..	
		"	T. de C. Arbuckle..	Kerridge
		"	B. Phipson ..	Strathcampbell
		"	M. Fraser ..	Winterhoek
		"	B. C. Gold ..	Woo-end
		"	J. R. Royston ..	Greenend
		"	J. van Whye ..	Silburn
H. van Rooyen ..	Vryheid ..	"	Jonas ..	Witpoort
		"	Mjebe ..	Fresgewacht
		"	Machaba ..	Roo-poort
		"	Mgeslo & Co. ..	Hardscamp
A. B. Koe ..	Portion of Estcourt	"	J. W. Moor ..	Moorleigh
A. J. Marshall ..	Dundee ..	"	R. J. du Bois ..	Giba
		"	J. W. de Bruyn ..	Rooifontein
		"	C. M. Vermaak ..	Paddock
		"	L. W. Meyer ..	Langverwacht
		"	A. L. Jansen ..	Strathearn
		"	J. O. Nel ..	Earncliffe
		"	A. C. Vermaak ..	Sigluna
		"	T. C. Vermaak ..	Harriotdale
		"	H. Vermaak ..	Paddock
		Lung-ickness	Govt. Loot Stock ..	Goodekens
E. Varty ..	Western Umvoti ..	"	T. J. Nel ..	Mt. Ernestina
J. J. Hodson ..	Ptn of Lion's River	"	A. K. Murray ..	Shawlands
		"	Mrs Vear ..	Brookdale
R. W. Stratford ..	Newcastle ..	Lung-sickness	H. Kumalo ..	Mossendale
R. Mayne ..	Krantzkop ..	Scab	W. W. Mare ..	Doomhoek
		Lung-sickness	P. R. Nell ..	Brooder's Hoek
G. Daniell ..	Vryheid ..	Scab	J. R. Steenkamp ..	Bloemhof
		"	G. Combrink ..	Goedehoop
		"	D. Coetzee ..	Rustplaats
R. Mayne ..	Eastern Umvoti ..	"	J. T. Nel ..	Craiglands
		"	P. R. Botha ..	Olivefontein
		"	do. ..	Mountain View
		"	J. J. Bronkhorst ..	Viak Viak Viakte
		"	Mtwali ..	Olivefontein
		"	Haleni ..	O.ivefontein
		"	J. J. van Rooyen ..	Overleit
		"	Mtshugongulu ..	Olivefontein
		"	S. C. van Rooyen ..	Small Hoek
		"	S. W. Cadle ..	Fairfield
A. Hair ..	City and Umgeni ..	"	Nombeyangene ..	Zwaartkop Location
J. Button ..	Portion of Estcourt	"	G. Ross ..	Roslin
		Lung-sickness	J. Bird ..	"
A. S. Parkinson ..	New Hanover ..	Scab	Swaiman ..	Location

MANGE IN HORSES EXISTS AS UNDER.

Name.	District.	Name.	District.
W. E. Oates ..	Bergville	A. G. Stafford ..	Harding
H. Turner ..	Lidgetton	Cazindhleli ..	Nqutu
A. M. Campbell ..	"	C. Harding ..	Weenen
Mboya ..	Bergville.	R. Thompson ..	New Leeds

EPIZOOTIC LYMPHANGITIS EXISTS AS UNDER.

Name.	District.	Name.	District.
Horses and Mules of Natal Estate Co.	Mt. Edgecumbe	Horses of H. Michaux ..	Durban
Mules of B. Caswell ..	Umgeni	Horses of Johnstone & Bates	"
Mules of Rancomar ..	do.	Horses of Parker, Wood & Co.	"
Horses of Benningfield ..	Durban	Horses of Shire & Co. ..	"
Horses of Durban Corpn.	"	Mule of J. D. Caldwell ..	"
Horses of Cornelius & Holt	"		
Horse of Mr. Bradley ..	"		

Principal Veterinary Surgeon's Office,
22nd January, 1907.

M. J. HIME,
for P. V. Surgeon.

East Coast Fever Notice.

The Minister of Agriculture has been advised by the Transvaal Department of Agriculture that no more slaughter cattle will be allowed to enter the Transvaal from Natal, save and except those for whose admission permits have already been issued.

Market Reports.

(Responsibility for the accuracy of the Statements and Opinions of the following Reports rests with the respective Contributors.)

MARITZBURG.—Messrs. W. H. Walker & Co. write: It is many years since Maritzburg and the neighbourhood have experienced such a continuous rainfall as that of the last 14 days. Some farmers state that they have had none too much, whilst others assert that it is impossible to get on to the land to work. Unfortunately trade does not show any inclination towards improvement, and prices, all round, are practically the same as those recorded for some months past.

Mealies.—Mealies are now becoming scarce, and prices have fluctuated between 14s. 4d. to 15s. 6d. per muid on the market; but as only small lots have come forward these figures do not show a fair reflex of what prices really are, as mealies are purchased at a much lower rate.

Forage.—Some good samples forward, prices realised being from 4s. to 4s. 9d. per 100 lbs.

Hay.—Owing to rain the market has been scantily supplied, and prices have fluctuated between 1s. 3d. and 2s. 9d. per bale.

Kafir Corn.—Fair supply offered at 6s. 6d. to 7s. per 100 lbs.

Potatoes.—Market well supplied with good tubers at 4s. to 6s. 6d. per 100 lbs; Sweet potatoes, 3s. 6d. to 4s. per sack.

Beans.—From 12s. 6d. to 15s. per 100 lbs.

Peas.—A few lots on offering realising from 6s. 6d. to 15s. 6d. per 100 lbs.

Poultry.—Common fowls have realised from 1s. 2d. to 2s. 9d. each. Market has been very indifferently supplied for some weeks past. Ducks, 8s. 3d. per pair.

Eggs.—Prices are firmer of late; from 1s. 4d. to 2s. 6d. per doz.

Butter.—Fresh butter from 11d. to 1s. 5d. per lb.; salt butter, 6d. to 10d. per lb.

Sunflower Seeds.—From 8s. to 8s. 3d. per 100 lbs.

Onions.—From 3s. 9d. to 6s. 3d. per 100 lbs.

Sundries.—Beef, 1d. to 7d. per lb.; salt beef, 4½d. to 5d. per lb.; mutton, 4½d. to 8d. per lb.; pork, 3d. to 6½d. per lb.; bacon, 2d. to 6d. per lb.; ham, 9d. per lb.; pigeons, 10d. to 1s. 1d. per pair.

Vegetables.—Market abundantly supplied with beans, beetroots, bringalls, cabbages, carrots, cucumbers, eschalots, lettuce, marrows, peas, green mealies, radishes and tomatoes.

Fruit.—Apples, bananas, grenadillas, grapes, mangoes, and pineapples.

Firewood.—Poles, from 5½d. to 7d. per 100 lbs.; cut wood, 7½d. to 8d. per 100lbs.

DURBAN—Bananas, 1s. to 1s. 6d. per bunch; bananas, 6d. to 1s. 3d. per 100; beans, 3d. per lot; butter (fresh), 10d. to 1s. 2d. per lb.; cabbages, 6d. to 2s. per doz.; eggs, 1s. 9d. to 2s. 6d. per doz.; fowls, 1s. to 4s. each; lemons, 2s. to 4s. per case; lettuces, 3d. per doz.; mangoes, 2s. to 5s. per 100; papaws, 6d. to 1s. per doz.; peas (green) 6d. per basket; pigeons, 7d. to 1s. each; pineapples, 6d. to 1s. 6d. per doz.; potatoes, 5s. 6d. to 9s. per muid; tomatoes, 1s. to 2s. per case.

JOHANNESBURG.—Messrs. Abinger Keeling & Co., P.O. Box, 564, on the 18th report:—Forage, best dry, 6s. 3d. to 7s. per 100 lbs.; forage, good and new, 5s. 6d. to 6s. per 100 lbs.; forage, medium, 4s. 6d. to 5s. 3d. per 100 lbs.; lucerne, 5s. to 5s. 9d. per 100 lb.; kafir corn, sound red, 13s. 9d. to 14s. 9d. per 203 lbs.; kafir corn, white and mixed, 2s. 6d. to 13s. 3d. per 203 lbs.; mealies, good Hickory, 13s. 9d. to 14s. 3d. per 203 lbs.; mealies, white, 13s. 6d. to 14s. per 203 lbs.; mealies, mixed and yellow, 13s. 3d. to 14s. per 203 lbs.; potatoes, 2s. to 8s. per 163 lbs.; vegetables, fresh, 1s. 3d. to 3s. bag; eggs, newlaid, 2s. to 2s. 9d. doz.; eggs, colonial, 1s. 7d. to 1s. 11d. doz.; butter, 9d. to 1s. 1d. per lb.

Live Stock.—Slaughter oxen, 6-700 lbs., £12 to £14 10s.; trek, £9 to £11; sheep (M. rinos) 23s. 6d. to 27s. 6d.; Capes, 21s. to 26s.; lambs, 15s. to 20s.; Pigs, 4d. to 4½d. per lb. live weight. Market overstocked with oxen, and prices easier. Good demand for sheep.

Mealies and Kafir Corn.—There is no change in prices to report on the morning market, which, generally speaking, is firm. Wholesale values have been steadily based on an average of the morning market. Small parcels which have been constantly coming forward for sale there have to a very great extent stopped. Failing continuous supplies to the morning market, values, generally speaking, improve for parcels. Really good whites are scarce and in very good demand; supplies of mixed and yellow have been equal to demand.

Forage.—Very considerable supplies have come forward to the morning market, and prices have been fairly steady. Except for specially good white, which realised as much as 7s. 3d. per 100 lbs., values have averaged 5s. 6d. for good clean new forage.

Potatoes.—Market has been very heavily over-supplied, consequently there has been very little demand for anything but choice tables.

Pound Notices.

The following cattle in the undermentioned Pounds will be sold on the 20th February next, unless previously released:—

Good Luck—Bay filly, no brands or marks, long mane and tail.

Mountain View—Bay mare, about 12 hands, aged, star on forehead, halter on, badly cut with knee halter, branded like R.R. (the last R raised) on off shoulder.

Umsinga—Black gelding, 14.1, aged, hollow back, star on forehead, slit in right ear, no brands.

Colenso—Red cow, branded, looks like F turned round, on near hip, two pieces out of right ear, one out of left, long tail; with red heifer calf, not branded nor marked.

To be sold on the 6th March next—

Nqutu—Two goats, both brown and white, no particular marks. On Archdeacon Johnson's land at St. Augustine's—Mule, brown, branded W.L. near hind quarter and J 3 on neck, circle with five points (or star) on off hind quarter.

Finchley—Chestnut filly, small star, light patch on off hip, near hind fetlock white, tail out square, has small piece of thin rope on neck, found at Mbuzo's Kraal, No. 3 Location, by Natal Police, Riverside.

Weenen—Black she goat, two nicks right ear. Black mule, mare, brown nose, branded O 961 right side of neck, V left side of neck, harness marked.

Hope Farm—Grey gelding, long mane and tail, brand indistinct, looks like W, on near hip, aged, about 14.2 hands, no ear marks.

Utrecht—Four mixed kafir sheep.
 Krantzkop—Black cow, branded C.N. on right side, about six years old. On the farm Broedershoek—Red cow, no brands, with black bull calf, also no brands.
 Howick—Red and white cow, left horn broken, aged, branded M on right hip. Red and white yearling heifer. The above described animals have been running on the Howick Commonage for twelve months.
 Acton Homes—Eleven mixed kafir goats.
 Impendhle—White ewe goat, tip of left ear cut off; and kid.
 Dundee—On the farm "Sheepridge,"—Dark bay filly, age about 3 years, about 13.3, white star, long mane and tail, branded M or JM (joined) near quarter. Reported by Mr. A. Jansen, Sheepridge, Dundee.
 Regina Farm, Division of Umzinto—Cow, young, black and white. Bull calf, white, with black spots. Bull calf, slate.
 Heifer calf, red, with few white marks on face and chest.
 Ladysmith—Bay mare, star on forehead, near hind foot white, about 13½ hands high, white mark on near fore fetlock, as if from reim, no brands visible.
 Boston—Black ox, age about 3 years, brand indistinct, looks like **Ma**. Bay mare, age about 4 years, height about 13.1, off ear nicked.

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(The Editor will be obliged if the Hon. Secretaries will supply him with lists of the Executives of their Associations.)

Central Experiment Farm, Cedara.

In order to minimise interference with the general course of work on the Central Experiment Farm, Cedara, it has been found necessary to set apart two days of the week, namely, Tuesdays and Fridays, as visitors' days.

Arrangements will accordingly be made on those days for receiving visitors and showing them round the Farm. A trap will be at Cedara Station to meet the up 9.50 a.m. train; and if intending visitors from up-country will give notice to the guard at Howick Station, on their way down, a trap will be sent to meet the train which passes through Cedara at 11.2 a.m. Visitors travelling by other trains will also be met if they will previously make arrangements by writing.

On other than visitors' days visitors may be received by appointment, but special attention cannot be guaranteed in regard to their being shown round.

At least fourteen days' clear notice must be given by associations so that there may be time to make all necessary arrangements.

W. F. CLAYTON,

Minister of Agriculture.

Model Rules for Agricultural Co-Operative Societies.

THE Department of Agriculture has for disposal, at the rate of one shilling each, copies of Model Rules for the use of Agricultural Co-operative Societies. Applications should be made to the Secretary, Minister of Agriculture, Pietermaritzburg.

Employment Bureau.

THE Department of Agriculture has received applications from the undermentioned, who are prepared to become assistants or apprentices on farms. The Department will be glad to hear from farmers willing to take young men as assistants, and to place them in correspondence with the various applicants. When communicating on the subject, farmers may refer to the applicants by quoting the numbers in the following list:—

No. 90.—22 years of age, active and not afraid of work, desires situation on farm where he can acquire knowledge of farming, small remuneration with board and lodging required.

No. 91a.—Scotchman, 40 years of age, single, who has had lifelong experience of stock and agricultural farming in Scotland. Has been three years in South Africa. Produces good references. Is of respectable and intelligent appearance. Seeks managership or assistant managership of farm, if possible. Salary not of first importance.

No. 92a.—Englishman, 50 years of age, with varied experience in tea and coffee planting in Ceylon, and also of contract work. Has also been on a Sugar Estate, and has had experience in pig rearing. Salary needed.

Trees for Sale.

To encourage tree-planting, transplants and seeds of forest trees are supplied by Government, so far as in stock, at the undermentioned rates, exclusive of carriage, from the Government Nursery, Central Experimental Farm, Cedara.

Transplants of Eucalyptus, Pines, Acacias, Casuarinas, Cupressus, etc., about 25 trees in each tin, at 8s. 4d. per 100 trees. Trees in separate tins at 1s. each.

Transplants of scarce kinds, larger trees, or surplus stock, when available, will be charged at special rates, which will be furnished on application.

Tree seeds, in variety, at 1s. per packet. Price per pound, which fluctuates, will be furnished on application.

Package and postage of seed, when required, charged 1s. per lb. extra.

Orders for present or spring delivery should be addressed to the **Forester, Cedara**, and must be accompanied by a remittance in cash or postal order. Cheques cannot be accepted.

T. R. SIM,
Conservator of Forests.

Bulletins Issued by the Dept. of Agriculture.

Single copies may be obtained free (excepting those with price attached) on application to the Secretary, Minister of Agriculture.

No.

- 1.—“Notes on Fruit Culture,” by Claude Fuller. [1902]. (*Out of print*).
 - 2.—“Manures on the Natal Market, 1902,” by A. Pardy. [1902].
 - 3.—“Insects in an Important Role,” by Claude Fuller. [1904]. (*Out of Print*).
 - 4.—“Manures on the Natal Market, 1903,” by A. Pardy. [1903].
 - 5.—“Weed Circular,” by Claude Fuller. [1905].
 - 6.—“Manures on the Natal Market, 1904,” by A. Pardy. [1904].
 - 7.—“Tree-planting in Natal,” by T. R. Sim. [1905]. (*Price 2s. 6d.*)
 - 8.—“Agricultural Co-operation,” by E. T. Mullens. [1905].
 - 9.—“Potato Culture,” by A. N. Pearson. [1905].
 - 10.—“Manures on Natal Market, 1905,” by A. Pardy. [1905].
 - 11.—“East Coast Fever,” by S. B. Woollatt. [1906].
 - 12.—“Manures on Natal Market, 1906,” by A. Pardy. [1906]. (*In the Press*).
- “Agricultural Statistics, Natal, 1904-5.” [1906].

Natal Agricultural Journal and Mining Record.

Tetanus.

JAS. L. WEBB, F.R.C.V.S., D.V.S., Ladysmith.

Definition.—Tetanus, better known perhaps under the name of “Lock-jaw,” is a specific disease characterised by spasmodic contraction of both voluntary and involuntary muscles. All the domesticated animals are susceptible; fowls are immune.

Cause.—Tetanus is caused by a vegetable micro-organism: many of the bacilli when stained and examined under the microscope will be seen distended at one extremity and shaped therefore like a drum-stick; the distension is due to the presence of a spore. The peculiar muscular contractions which distinguish this disease are produced by the action on the central nervous system of a poison manufactured by the bacilli in the tissues around the seat of infection.

Before the discovery of the germ of Tetanus in 1885 the disease was looked upon as being caused by a reflex irritation of the nerve centres from which the affected muscles obtain their nerve supply, such irritation being attributed directly to the presence of a wound, if one could be found, and if not, to climatic influence, or to fatigue, or both, especially if associated with unsuitable diet and defective sanitation, but such theories were never very acceptable to scientists, and we now know that the mere presence of a wound and conditions unassociated with the presence of the specific germ have nothing to do with the disease.

Tetanus used to be spoken of as traumatic when a wound could be discovered, and idiopathic when no wound could be observed. These terms are now obsolete. There must always be a wound through which the germ has gained an entrance into the tissues. Such wound is often out of sight, as when in the uterus or alimentary tract. Wounds which penetrate deeply into the tissues are most likely to be followed by

Tetanus, because in these the germs can develop away from the action of the atmosphere; oxygen is inimical to their growth. Tetanus is also found to develop when infected wounds are nearly healed for the same reason, *i.e.*, because the scab has shut out the air and so rendered the parts suitable for the growth of the germs.

Tetanus can be induced experimentally with toxin obtained by growing the organism in bouillon in an atmosphere of hydrogen and injecting it under the skin of an animal; the toxin is so powerful that two drops are sufficient to kill a horse.

It will be gathered from the foregoing that Tetanus is an intoxica-

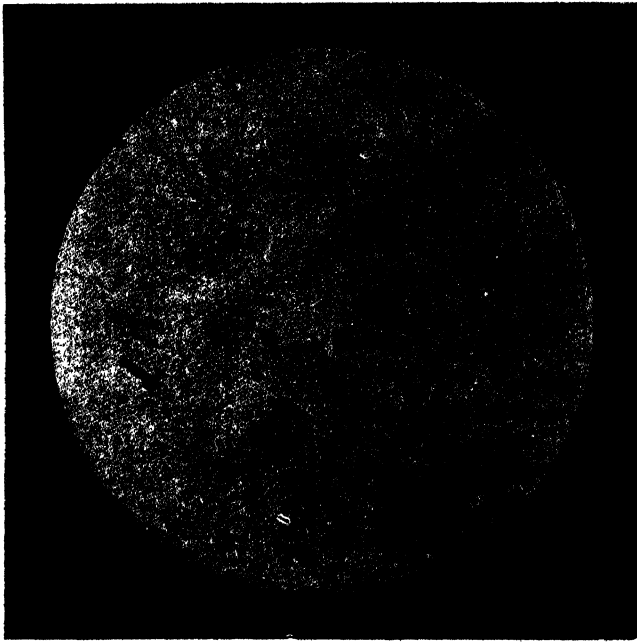


FIG. 1.—TETANUS BACILLUS.

Pure Culture, magnified 1,000 diams.

Note spores at end of bacilli "drum-stick" formation.

tion produced by Tetanus toxin which in the natural way is manufactured by the germs at the seat of infection; the poison travels along the nerve trunks from the wound to the nerve centres, there it appears to enter into chemical union with the cell protoplasm. It can be shown experimentally that Tetanus toxin has a special affinity for nerve substance. If the toxin is thoroughly mixed with brain tissue, the toxin becomes incorporated with the nerve cells, and if a fatal dose is so treated it can be injected into an animal without fatal results.

The organism of Tetanus is ubiquitous, but more especially is it to be found in garden soil which has been kraal-manured. Animals must

receive many wounds to which the organism of Tetanus gains access without any ill results following; that harmful results do not always follow is probably accounted for by the prompt action of the phagocytes—certain blood cells whose duty it is to act as safeguards to the system against bacterial attack, which they do by enveloping and digesting micro-organisms. It is believed that the organism of Tetanus is more likely to develop when the tissues are the seat of a mixed infection and the phagocytes are employed in attacking other organisms, and so allow those of Tetanus time to manufacture their toxin. Once toxin is produced the phagocytes are helpless; it has been proved by experiment that if Tetanus germs are introduced into the tissues after being freed of their toxin they are at once attacked by the phagocytes, destroyed and digested, but if some substance is at the same time introduced which will keep the phagocytes in check, then the germs will manufacture their toxin and Tetanus will follow.

Period of Incubation.—This appears to vary considerably, and differs in different animals. It has been discovered by experiment that if a moderate dose of toxin is injected it takes from 36 to 48 hours before symptoms are developed in the dog, about four days in the ass, five days in the horse, and four days in man. Tetanus, which develops naturally, takes from 6 to 29 days to incubate.

Symptoms in the Horse.—According to the rapidity with which the

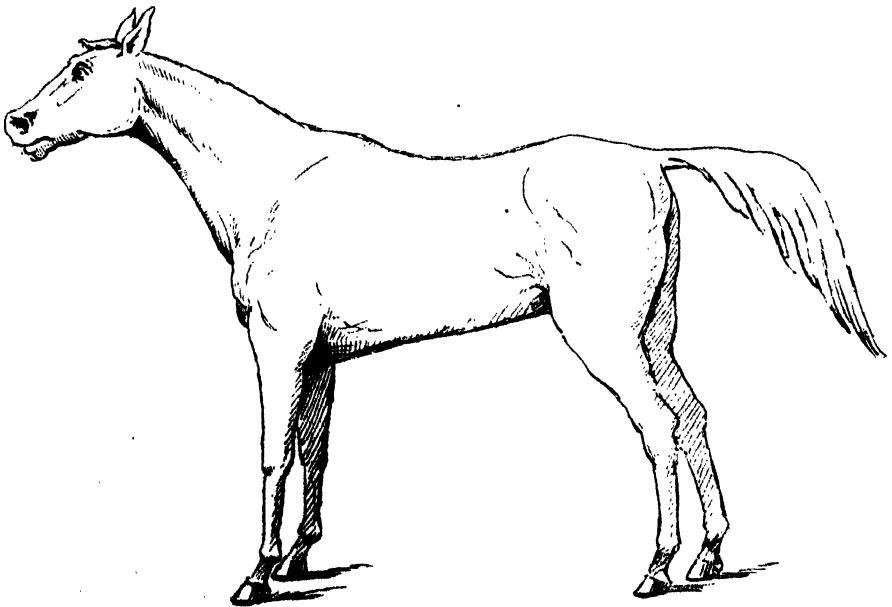


FIG. 2.—HORSE SUFFERING FROM TETANUS.

This sketch endeavours to show the elevated head, cocked ears, dilated nostril, straddled position of legs, and raised tail.

symptoms develop, the disease is spoken of as Acute and Sub-acute. The acute form is almost invariably fatal, the symptoms are severe and reach their climax on the third or fourth day after commencement; in the sub-acute form twelve or thirteen days may elapse before the disease reaches its height. The signs shown by a horse in a typical case are stiffness of gait, the animal moves with legs straddled and with as little movement of the joints as possible, the head is elevated, mouth opened with difficulty, eyes withdrawn into the orbit, and if frightened the animals quickly throws the haw over the eyes, the tail is raised and tremulous, nostrils dilated, breathing accelerated, the animal often breaks out into perspiration, the countenance is haggard, pulse full and incompressible, internal temperature raised several degrees, the abdominal muscles are contracted, giving the horse a "tucked up" appearance. The acts of urination and defaecation are partially or entirely suspended. The animal is usually thirsty, but swallows with difficulty, the fluid often returning down the nostrils, causing a paroxysm of coughing, which greatly excites him.

Death may be due to continued spasms of the muscles of respiration or of the heart, or by the action of the toxin of Tetanus on important nerve centres, or to general exhaustion.

The symptoms in the ruminants are much the same as in horses, but nervousness is not so marked, and hoven is generally present.

Treatment.—As Tetanus is indirectly due to a wound, search should always be made to see if one is present; in horses the disease often follows wounds penetrating the hoof into the sensitive structures; it is also met with after such operations as castration and docking; in cattle it may follow parturition and retention of the after-birth, especially where manual assistance has been given and the parts have become soiled, as also operation and other wounds which have become infected with this particular germ; in sheep the disease sometimes follows wounds made during shearing, as also after docking and castration. If a wound can be found this should be thoroughly disinfected, particularly in its depths, and the best disinfectant to use is a solution of iodine, as this drug has a special action on the germ and toxin. If the disease has followed docking, it is good treatment to dock the animal again and remove about an inch more of the tail and sere the extremity with a hot iron. Horses should be placed in as quiet a spot as possible, as any noise intensifies the symptoms; the stable should be well ventilated and darkened. If the horse is not of an excitable temperament he should be slung. If the animal does not urinate freely the urine must be drawn off with a catheter, and the rectum should be emptied by "back-raking"; the bowels are usually constipated, so opening medicine is to be given. This is perhaps best accomplished by giving small doses of Epsom salts in the drinking water. Care must be taken to supply suitable nutriment in the shape of gruel and sloppy mash, which the animal may suck into its

mouth. No attempt must be made to give either food or medicine by force. Sedative medicines are generally prescribed, such as extract of belladonna, cannabis indica, chloral hydrate, etc., but it is doubtful whether they are of much use. These drugs are best given in the form of an electuary. Medicines may be given to the ruminants directly into the rumen through a canula.

Iodine appears to have power to neutralise the toxin of Tetanus, and some good results from its use have been recorded; it is administered as a solution dissolved with pot. iodide, either intratracheally, subcutaneously, or intravenously.

Great results were expected from the use of anti-tetanic serum, but the records of its use are very contradictory. In the hands of some veterinary surgeons it has given excellent results, but it appears necessary that if it is to be of any use the case must be taken in hand early and large doses administered. Its failure in cases where the symptoms are fully established is due to the toxin having become fixed in the nerve cells, but at the same time I think it is worth a trial in every case, if only to neutralise the free toxin, and some writers seem to think that if only injected in large enough quantities, the union of the toxin with the nerve cells can be severed, because the toxin has a greater affinity for the anti-toxin than for the protoplasm of the nerve cells. It has been suggested that intracerebral injection of the toxin, through being brought into direct contact with the nerve centres, would hold out better hope of success, and in fact several cases have been successfully treated in this manner.

As a preventative treatment, the injection of anti-tetanic serum is good, and in districts where the disease is prevalent, it is wise to inject a dose, more particularly into horses, that have received penetrating wounds, and after such operations as castration and docking.

Short Notes.

AGRICULTURAL SHOWS.—In this issue is published for the first time the list of Shows, giving dates, etc., for the present year.

EAST COAST FEVER.—The covering report of the monthly District Reports of the Veterinary Surgeons is written by Mr. Power, Mr. Woollatt being absent on duty. The main feature of interest in almost all the reports is centred in East Coast Fever. The mere relation of the facts concerning the outbreaks should bring home to all the gravity of the situation.

RAMIE GROWING ASSOCIATION.—A large number of letters have reached us asking for the address of the Ramie Growing Association. The address is:—Mr. Edwards-Radcliffe, Ramie Growing Association, Staines, England. In the present issue will be found an article by Mr. W. J. Bell on the merits of Ramie. Much has appeared in the *Journal* at different times with regard to this interesting fibre. An article extracted from the *Bulletin of the Imperial Institute* (No. 1, Vol. VIII.) treated the subject with marked breadth of view both from the manufacturers' and growers' point of view.

DRY FARMING.—Mr. J. G. Fannin, Mollisema, Dalton, writes:—"I send you a copy of *Life*, in which is an article on 'Dry Farming,' which I think might be reproduced in the *Journal* with advantage to all, especially those who insist that our draughts are detrimental to agriculture. My personal experience has been that much can be done to overcome the evil effects of droughts, by purely mechanical means, and yet this point in agriculture is rarely understood or practised." The subject of cultivation has always received much attention in the *Journal*. In the September issue of the last volume and in the first of the present volume notice was being given to the recent popular descriptions of dry farming in the United States. We have much pleasure in complying with Mr. Fannin's suggestion as to the publication of the article.

BACON.—It is really strange that Natal should not be able to meet its own demands in bacon. In 1905 the Colony imported 2,107,178lbs., valued at £66,782, and of lard 698,400lbs., valued at £12,249. Most regrettable it is that such an annual sum—nearly £80,000—cannot be kept in the Colony. In the times which seem now to have gone by, times when the value of mealies fluctuated like that of gold-scrip, it can be easily understood how pig-rearing on a large scale would not present attractions. The conditions are now different; mealies are not likely to be much more than 10s. per muid on the farm in future, and it is not improbable that their value on the spot will generally be somewhat less. In the production of bacon, mealies, of course, are an important factor. Separated milk, which is an important article in the dietary of pigs, has also become abundant of late years. Then, again, that rich, and in many districts heavy-cropping grass *Paspalum dilatatum*, and much liked by pigs, is becoming plentiful in parts of the Colony. In this issue will be found the Annual Report of the Highflats Farmers' Association, wherein this grass is highly spoken of in connection with pig-rearing. When the foregoing facts are taken into consideration, it would seem that the present conditions clearly point to the advisability of breeding pigs on a considerable scale. Well managed, the business should prove profitable, and it has the distinct advantage of giving quick returns. The curing should, of course, be done on co-operative lines.

DEVONS.—“C. L. H.” writes to the *Live Stock Journal*:—Your correspondent’s letter of the 30th November, headed “The Two Devon Breeds,” is rather misleading. It would appear to a stranger that the two breeds are North and South Devon; as a matter of fact the two breeds are Devon and South Devon, or (as they always used to be known as) South Hams. The so-called “North Devon” is not recognised as a breed, as they have few entered in Davy’s Devon Herd Book for nearly thirty years. The reason that I have written this letter, which I hope you will be good enough to publish, is that several orders from abroad have miscarried lately owing to these facts not being thoroughly understood.

ENSILAGE FOR THE DAIRY.—Until the value of ensilage is realised by everyone in the Colony who feeds cattle and horses, it will be necessary in these pages to recur again and again to the subject. In both of the “interviews” in this issue testimony to the merits of ensilage will be found. Writing in a recent number of the *American Agriculturist* on the value of pumpkins as cow food, a dairyman, H. O. Daniels, Pres. Ct. Dairymen’s Association, says:—“I think they (pumpkins) were very good for milk production, but now after 20 years’ use of the silo, I unhesitatingly say I know of nothing that can equal good, clean, sweet corn silage for an economical, safe, all-the-year-around, palatable milk producing food. If I were obliged to give up the use of the silo through some fanatical board of health, milk inspector, etc., I should want to go out of business of feeding a dairy herd. This may seem like a strong statement and I am aware that the help question has settled this matter for many of our dairymen already, by their being unable to care for and harvest the crop. Yet everyone who has come to that condition deplores the fact that he has no silos full of good silage to feed this winter. Roots, pumpkins, cabbages, all have their place with the small dairy, but for a dairy farmer who feeds 50 or more cows, an all-the-year-around silage ration is hard to equal.”

OX-HARNESS.—A correspondent asks for information about ox-harness. At various times a good deal of attention has been given in the *Journal* to this class of harness. In harness it is indisputable that oxen can pull much more than if yoked in South African or any similar fashion. But harness, for several reasons, is not in favour in the Colony. Farmers who breed oxen have, as a rule, plenty for their farm work and are glad to break in as many as possible. Harness requires proper attention, which cannot be expected from natives; yokes, keys, and strops call for only a minimum of attention—about as much as may be expected from an average native. Small owners of oxen who can give personal attention to the harness for the greater part do not know of ox-harness, or possibly they have not enterprise enough to make a departure from colonial practice. The particular enquiry of the correspondent can be

easily answered from the personal experience of the writer of this "Note." Borrow, or buy for a few shillings, a horse collar. Put it on the animal's neck upside-down. Rope will make good traces. Here is the ox-harness for a cultivator complete. The swingle-tree if the ox is large should be a little longer than a horse swingle-tree, and may, of course, be made from any piece of bush hard-wood. A muzzle will be necessary, and can easily be fashioned with two or three yards of fencing wire. Messrs. Reiche, Nodsberg Road, sell properly manufactured ones for a shilling or two. A voor-looper is necessary; no ox could be expected to answer reins well enough among mealies almost within reach of his tongue. The article referred to by L. C. S. was an "interview" by Ergates with Mr. J. Lilienthal, page 757 of last year's volume.

Quackery in Veterinary Medicines.

"DELTA" writes:—Probably nowhere do empirics or quacks flourish more than in our little Colony of Natal; the Press supports and encourages them, the public extols their limited knowledge, and they fill their pockets out of the public's gullibility.

Why is it so many men would rather believe and act on the advice of the quack, who possess no intrinsic knowledge of disease, rather than credit the man whose powers of observation have been guided by scientific study? I am inclined to think jealousy acting on a naturally perverse disposition accounts to a great extent for this peculiarity in certain individuals. The stock-owner is usually very jealous of the knowledge he has gained by a superficial observance of animal diseases, and the degree of such feeling increases in intensity as we descend the scale of ignorance, and he is naturally antagonistic and suspicious of the man who is in a position to profess special knowledge. The quack is more on an equality with himself; they both pretend to knowledge which they do not possess.

Quackery appeals to the man with limited reasoning power and superficial knowledge. Knowledge gained by scientific research and placed on a sound basis which takes a trained mind to grasp, he rejects as absurd, because beyond his comprehension, and so the quack flourishes and collects lucre, and there is no easier way of making money than by the practice of empiricism. The quack's stock-in-trade consists of a few simple and easily digested theories expounded in a boastful and dogmatic manner, some well-advertised nostrums, for which he must claim infallibility, supported by lies, no matter how transparent. With these he can gull some of the public all the time, and some of the public part of the time, but, thank goodness! not all the public all the time; and if he is sensible enough to make his nostrums innocuous Dame Nature will help him to make a reputation. He will obtain the credit for her cures, but he must be careful not to tamper with the powerful

drugs, nor startle the public with theories quite too obviously absurd or he will get hoist with his own petard. The majority of quacks recognise this principle, but occasionally one more puffed up than his fellows oversteps this axiom; give such an one rope enough and he will eventually hang himself.

Quackery seems to be inherent in the natures of many men; the man who, as it is termed, has been brought up with stock and who has consequently been brought into contact with some of their diseases is apt to lay claim to special knowledge concerning such diseases and their treatment, and yet how few of them have gained any real knowledge from such contact. It is not to be wondered at, for unless a man's powers of observation have received training in the proper direction, it is impossible for him to draw correct deductions.

One hears it asserted that such men must have gained considerable knowledge of animal diseases from experience; experience is no doubt a great help to the scientific man, but acquaintance with disease gained by experience alone is not sound, because the mind is incapable of placing a correct interpretation to the signs exhibited. Without an intimate knowledge of each tissue and organ, their appearance in health as well as in disease, together with their functions, it is absurd to expect anything else but stupid and wrong deductions.

Is it not strange too that the less a man knows about animal disease, the more dogmatic become his assertions? The man with an up-to-date knowledge of veterinary medicine is quite modest, he recognises what a lot he has to learn and what possibilities there are in front of him; not so the man full of experience and nothing else. Watch the two men examining a sick animal. The trained man, after noting the symptoms and after a careful and systematic examination of the points which aid diagnosis, such as the internal and external temperature, character of the pulse, rate and character of the respirations, auscultation of the thorax and abdomen, etc., may still be somewhat in doubt as to the exact nature of the disease, but the "man of experience" comes along, glances at the animal and is immediately cock-sure what is wrong, and is usually capable of giving the trouble some such meaningless name as bush-sickness, veld-sickness, stop-sickness, etc., and will advise the administration of some such useful remedy as a bar of soap, a lump of Bell's grease, soot and vinegar, a pound of chicory, etc.

The quack who pretends to a knowledge of animal diseases is a most dangerous man, especially if upheld and encouraged by the Press—it is perhaps natural they should give a helping hand to such a good customer—but it is not fair to the public in general, especially when they disparage knowledge established by scientific research. The quack does practically little harm so long as he sticks to preparing his "cure-alls," but when it comes to flaunting his stupid ideas on disease in the public Press and denying the truth of established facts he becomes a danger to

the whole community, because many people will believe he must have a good basis on which to lay his bold assertions and will give credence to them and act on them, thereby not only jeopardising their own animals but those in their neighbourhood as well.

In this Colony, with its many communicable diseases, preventive measures are of far and away more value than curative, but prophylaxis does not appeal to the quack, unless he can induce people to believe such can be obtained by frequent administration of his particular nostrums. Preventive treatment based on scientific research, such as smoking stables to prevent "Horsesickness," passing troops of cattle amongst which East Coast Fever has made its appearance through temperature camps, immunisation by serum, therapy, etc., have no charm for him, for the reason that he cannot grasp their usefulness nor make money out of their application.

South African Products Exhibition.

NATAL EXHIBITORS.

By T. R. SIM, F.L.S.—S.S. "Durham Castle," Las Palmas, 26-1-07.

Now that the entries have closed and the exhibits are mostly shipped, it is possible to form some idea of the diverse nature of the products exhibited by Natal, and to give kudos to those who, by exhibiting, have done what they could to help the Colony forward. The list of products originally issued, as showing the classes in which exhibits were desired, has been found to meet the case well, hardly any of the classes being unrepresented, while very few additional classes have been found necessary. The idea of personal gain has had little to do with bringing forward exhibits, even awards of merit, or prizes or medals, being less frequently a consideration than a patriotic desire to show that the Colony is not altogether devoid of products, or of value. Some exhibitors have, however, done much more than others, sending in material of very diverse nature, while it is to be regretted that many who could did not contribute, and thereby prohibited selection being carried so far in Maritzburg as it otherwise would have been.

As it is, the total of 500 exhibits will run to about 150 tons measurement, an amount considerably in excess of the most sanguine expectations during the earlier stages; while in quality, however, the exhibits may compare with those of other Colonies, they would invariably take good places at local shows in Natal, and consequently represent in a fair manner what the Colony is fitted for the production of. Only in a few cases were exhibits rejected, and these were mostly cases where new products were sent forward with a view to commercial valuation, while such valuation was easily obtained locally, and was in fact obtained and found unsatisfactory before refusal was given.

Among the more general exhibitors, Messrs. Bazley Bros., Ifafa; Mrs. P. H. Campbell, Chase Valley; Mr. W. W. Cato, Mount Vernon, Hillarys; the Trappists, Mariannhill; Messrs. Trotter & Co., Pinetown; Hawksworth & Sons, Esperanza, deserve special mention, while the Director of Experiment Farms supplies a most varied collection from Cedara, Winkel Spruit, and Weenen Experiment Farms, and several Maritzburg firms were good enough to fill all remaining gaps at the last minute.

Taking the classes separately, the following are the principal exhibitors, though the list is not yet quite complete, especially in regard to fresh fruit, which will continue to arrive for some weeks after this is written and may vary in accordance with how the fruit develops:—

Tea.—Messrs. J. L. Hulett & Sons, Kearsney; Messrs. Bazley Bros., Barnsdale Tea Estate; Messrs. W. R. Hindson & Co., Clifton Tea Estates; and The Aroma Tea Estate, Nonoti.

Sugar.—Messrs. Hulett & Sons, Messrs. W. Hawkesworth & Sons, and the Natal Estates, Ltd.

Sugar Cane is also sent by Messrs. Bazley Bros., T. G. Colenbrander, and from Winkel Spruit Experiment Farm.

Syrup.—Natal Estates, Ltd.

Spirits.—Mr. A. Wilkinson, Ottawa Estate (Rectified Spirits, Rum), and Mr. A. Dryden, Pinetown Bridge (Orange Tincture).

Wines.—Mr. R. S. Large, Mid-Illovo, and Mr. A. Dryden, Pinetown Bridge.

Lemon Juice.—Mrs. P. H. Campbell, Chase Valley.

Coffee.—Messrs. Hulett & Sons, Mr. W. W. Cato, Messrs. Bazley Bros., and Mr. J. M. Wood, A.L.S., Botanic Garden, Durban (Disease proof).

Chicory and Chicory Substitutes.—Mr. W. W. Cato, Mount Vernon Estate, Hillarys.

Arrowroot.—Messrs. Archibald & Co., Umzinto; Mr. J. W. Aiken, Port Shepstone; and Winkel Spruit Experiment Farm.

Ginger.—Mr. J. W. Aiken, Port Shepstone.

Tobacco and Cigars.—Mr. W. Starr, Verulam; Natal Tobacco Plantations, Ltd., Beaumont; Mr. W. Bunge, Murchison; Messrs. Chetty and Co., and Messrs. J. A. Freerks & Co., Durban.

Cayenne Pepper.—Messrs. Bazley Bros.

Ostrich Feathers and Egg Shells.—Mr. G. S. Keel, Bowwood, Impanza.

Rubber.—Messrs. Lépper & Penington and the Forest Department.

Wattle Bark.—Messrs. Holley Bros., Broadmoor; H. von Bulow, Wartburg; W. Bunge, Murchison; J. Pope Ellis, Winter's Kloof; Mooi River Wattle Co., Town Hill Wattle Co., Harden Heights Wattle Co.

Wattle Wood, with a view to economic utilisation.—Harden Heights Wattle Co. and the Forest Department.

Wattle Seed.—Messrs. R. Mason & Son, G. Carter & Co., and the Forest Department.

Wattle Fruit Boxes.—Harden Heights Wattle Co.

Mimosa Gum.—Mr. H. A. Page, Krantzkop and the Forest Department.

Medicinal Aloes.—Mr. H. Illing, Ladysmith, and Forester Pole, Weenen.

Timber Specimens.—Forest Department (logs of about 50 kinds, also native carvings, polished picture frames and photographs of trees growing in Natal; Merryweather & Sons (stinkwood yokes; sneezewood keys and assegai spokes); Messrs. Cromwell & Carter (carvings in local timber); P.W. Department (timber affected by white ants).

Cotton.—Mr. W. W. Cato, Hillarys (several kinds, in bulk); Mr. D. C. Slatter, Weenen; Mr. J. Kirkman, M.L.A.; Master D. E. Mitchell, Imbezane; and the Winkel Spruit Experiment Farm (24 varieties); while Mr. J. Kirkman, M.L.A., shows also cotton seed and cotton cake.

Aloe Fibre.—South African Industrials (Major Silburn, M.L.A.); Mr. Reitan, Batstone; Mr. Plows, Port Shepstone; Forest Department (all Sisal hemp); and Cedara Experiment Farm (American aloe).

Ramie Fibre.—Mr. Eglington, Maritzburg, and Mr. Slatter, Weenen.

Silk.—Master G. Sim.

Other Fibres.—Mr. D. Brown, Darnall, and Mr. F. Schroenn (Impongozembe); Mr. Malcolm Mackenzie, Inchanga, and the Maritzburg Garden (Sansiviera fibre); Mr. C. R. Bishop, Umgeni (New Zealand flax); Mr. Wellington, Bluff (Bathinia fibre); Mr. E. A. Purser, Umlalazi (Ilala fibre); Forest Department (fibres of Insangu, Umlolwa, Sansiviera, Sida, Gnono, and Strelitzia augusta); Mr. J. M. Wood (*Usi* fibre).

Honey.—Mr. Pepworth, Faugh-a-Ballagh.

Cheese.—Messrs. Norrish & Co., Maritzburg.

Fertilisers.—S.A. Fertilisers Co., Durban, and Greytown Lime and Fertilisers Co.

Curry Powder.—Messrs. Trotter & Co.

Chutneys.—Mrs. Vincent Seymour and Messrs. Trotter & Co.

Vegetables.—Mr. W. Merritt, Richmond.

Potatoes.—Mr. J. A. Peters, Mr. F. Schroenn, and Cedara Experiment Farm.

Sweet Potatoes.—Mr. F. L. Goble, Clairmont, and Winkel Spruit Experiment Farm.

Carrots.—Weenen Experiment Farm.

Amadumbe.—Natal Government.

Beans.—Messrs. W. B. Bosse, Rosebank; S. C. Hawksworth, Equeefa; Winkel Spruit Experiment Farm; T. Braithwaite, Sevenoaks; Trappists; Reichenau; R. Mason & Son, Maritzburg (collection); and Central Experiment Farm, Cedara (large collection of kinds).

Ground Nuts.—Messrs. Archibald & Co., Umzinto, and J. W. Aiken, Port Shepstone.

Indhlubu.—Rev. J. Scott and Mr. Mason.

Peas.—Messrs. G. Ross, Riversdale; R. Mason & Son, Maritzburg; G. Carter & Co., Maritzburg; and Winkel Spruit Experiment Farm.

Onions.—Messrs. D. C. Slatter, Weenen; T. Braithwaite, Sevenoaks; F. Rottler, Greytown; and Weenen Experiment Farm.

Chillies.—Messrs. Bazley Bros., Barnesdale Tea Estate (fresh and dry).

Mealies as Grain.—Mr. John Moon, Manderston; Mr. W. B. Bosse, Rosebank; Mr. G. Ross, Riversdale; Messrs. Archibald & Co., Umzinto; and the Central Experiment Farm, Cedara.

Mealies on Cob.—Mr. John Moon and Mr. Wm. B. Bosse.

Mealie Forage.—Cedara Experiment Farm and Mr. C. Bell, Burger Street, Maritzburg.

Oats as Grain.—Mr. T. Braithwaite, Sevenoaks, and Mr. J. A. Peters, Maritzburg.

Oats as Forage.—Mr. T. Braithwaite, Sevenoaks; C. E. Hancock, Ixopo; G. Martin, Ixopo.

Kafir Corn.—Mr. Wm. B. Bosse, Rosebank; Mr. G. Ross, Riversdale; Messrs. Archibald & Co., Umzinto; Messrs. R. Mason & Son, Maritzburg; Mr. J. A. Peters, Maritzburg; and Cedara Experiment Farm (large collection of varieties of sorghums).

Millets.—Messrs. G. Ross, Riversdale; R. Mason & Son, G. Carter and Co., and Cedara Experiment Farm (collection of varieties).

Paspalum dilatatum.—T. R. Sim and Cedara Experiment Farm.

Wheat.—Messrs. G. Carter & Co., J. A. Peters, Maritzburg, and Trappists Reichenau.

Bye.—Trappists, Reichenau and Cedara Experiment Farm.

Barley.—Cedara Experiment Farm.

Lucerne Hay.—Mr. D. C. Slatter, Weenen, and Weenen Experiment Farm.

Clover, in Bundles.—Cedara Experiment Farm.

Blue Grass Hay.—Messrs. John Moon, Manderston, and Blackborough, Maritzburg.

Red Grass Hay.—Messrs. G. Ross, Riversdale, and Cedara Experiment Farm.

Sugar Forage.—Cedara Experiment Farm.

Buckwheat.—Messrs. R. Mason & Son.

Linseed.—Cedara Experiment Farm.

Sunflower Seed.—Messrs. G. Ross, Riversdale; R. Mason & Son, G. Carter & Co., and Cedara Experiment Farm.

Lime.—P.W. Department (Umzimkulu lime), Mr. D. C. Aiken (Umzimkulu lime), Greytown Lime and Fertiliser Co. (agricultural lime).

Coal.—Natal Navigation Colliery and Estate Co., Hatting Spruit; Dundee Coal Co., Ltd., Talana; Bonas Bros., Hlobane; and Commissioner of Mines (output columns).

Other Minerals.—Mr. D. C. Aiken (Port Shepstone marble); P.W.

Department (Park Reunie granite and Greytown freestone, white and blue); Mr. E. Rogers-Jenkins, Durban (gold-bearing quartz from Wonderfontein Farm); Mr. E. L. Acutt, C.M.G. (copper); and Maritzburg Corporation (kerbing granite).

Native Basketware.—Mr. S. C. Hawksworth, Equeefa; Mr. J. Gryspeert, Maputa; the Trappists, Mariannhill; and Natal Government.

Rustic Flower Stands.—Natal Government.

Native Walking Sticks.—Natal Government.

Native Curious and Productions.—Mr. F. Schroenn, Falklands; Mr. C. C. Foxon, R.M., Umlalazi (large collection); Major Choles (shields); Mr. R. Mason (shield); Mrs. Walker, Burger Street (shield, assegais and grasswork); J. Gryspeert, Maputa (beadwork, shells, sticks, etc.); Trappists, Mariannhill (palm hats); Mr. A. Hughes, Church Street, Maritzburg (large collection); Natal Government.

Horns of Game.—Mr. A. Hughes, Church Street (large collection); Messrs. Bazley Bros., Ifafa; Natal Government Museum; and Natal Government.

Skins of Animals.—Mr. Deane, M.L.A. (haartebeest hides); Messrs. Bazley Bros. (buck skin, python skins, otter skin); Mr. F. W. Shaw (leopard's skin); Mr. G. Melville, Maritzburg (python skin).

Entomological Specimens.—Mr. H. von P. Berensberg, Maritzburg.

Osiers.—Hon. Jos. Baynes, C.M.G., M.L.A.

Whipsticks.—Mr. W. J. Jackson, Pinetown, and Mr. A. Dryden, Pinetown Bridge.

Bamboos.—Mr. P. H. Campbell, Chase Valley; Bazley Bros., Ifafa; A. Dryden, Pinetown Bridge; G. Wilkinson & Co., Town Bush Valley.

Spanish Reeds.—Mr. P. H. Campbell, Chase Valley.

Salt Butter.—Natal Creamery, Ltd., Mooi River; Nel's Rust Model Dairy (Hon. Jos. Baynes, C.M.G., M.L.C.); Mr. W. Moller, Mardcnash.

Eggs.—Mr. G. Ross, Riversdale.

Hides.—Mr. H. S. Chandler, Maritzburg.

Ox Horns.—Natal Government.

Wool.—Messrs. Jas. Morton, Tweedie Hall; G. Richards, Summerhill; H. Walker, M.L.A., Highflats.

Mohair.—Mr. G. Melville, Longmarket Street, Maritzburg.

Photographs.—Mr. Allerston (views of Berg, photos of buck's horns, butterflies, etc., and lantern slides); Mr. Watkinson, railway photographer (views of Natal and lantern slides); Natal Navigation Collieries and Estate Co. (photographs of their Hatting Spruit Mine); Editor, *Agricultural Journal* (illustrations from the *Agricultural Journal*).

Plans.—Surveyor-General (map showing industries, locations, open Crown lands, etc.); Commissioner of Mines (map showing mineral distribution); Mr. Stanley Hudson, architect, Durban (plan of new Town Hall, Durban).

Fruit Preserved in Syrup, Jams, Jellies.—Mrs. P. H. Campbell (large exhibit); Messrs. Trotter & Co. (large exhibit); Mr. C. H. Mitchell,

Imbezane (gooseberry pulp); Mrs. F. Turner, Loop Street, Maritzburg; Mrs. F. Stayner, Cedara; and Natal Government Museum.

Marmalade.—Mrs. P. H. Campbell, Mrs. Turner, and Mrs. Stayner.

Candied Peel.—Mrs. P. H. Campbell.

Mealie Meal.—Messrs. R. Mason & Son, W. H. Walker & Co., and Cedara Experiment Farm.

Crushed Mealies.—Cedara Experiment Farm.

Samp.—Mr. T. Lawes, Maritzburg.

Manufactured Goods.—A.B.C. Colonial Confectionery Factory (nutrine); Mr. W. W. Cato, Hillarys (tapioca flour); Maritzburg stoneware, Tile and Pottery Co. (pottery and fireclay); Merryweather & Sons (spokes, yokes, yokekeys); Forester Fernando (charcoal); Trappists, Mariannhill (palm hats, fancy baskets, air bricks and drain pipes); Molassine Meal Co., molassine; Mr. A. Oliff, M.L.A. (Maritzburg bricks).

Publications.—P. Davis & Sons (selection of their publications); Times of Natal Printing Co. (selection of their publications); Union-Castle Shipping Co. (Guide to South Africa); T. R. Sim (set of his books).

Leather Goods.—Messrs. C. C. W. Eddels & Co. (leggings); Trappists, Marianhill; G. Melville, Longmarket Street; Lyle Bros., Church Street.

Sundry.—Mr. Purser, Umlalazi (nuts of Ilala palm); Lyle Bros. (models of reserve ammunition panniers, racks for intrenching tools, and pack saddles for carrying these or for general military purposes); Bazley Bros. (indigo plant and seed); Botanic Garden, Maritzburg (Lycopodium plants, orchids and bulbs); Miss Anderson, Marriott Road, Durban (fish scale work); T. R. Sim (useful plants, etc.); Mr. W. W. Cato, Mount Vernon Estate, Hillarys (castor oil seeds of kinds, pollards, etc.); Cedara Experiment Farm (pollards, bran, lupins, and mealie husks for packing fruit); Forester Pole, Weenen (Castor-oil beans and dry aloe leaves); Hollow Brick Block Syndicate, Durban (hollow bricks); P.W. Department (drain pipe choked with ficus roots); Mackenzie Bros. (models of uniforms of Carbineers, D.L.I., Senior and Junior Cadets); Natal Government Museum (shield with Natal Coat of Arms); Forest Department (seeds of "Umbaba" for oil).

Fresh Fruit: Pineapples.—Mr. H. Howard, Malvern; Mr. C. F. Ford, Maritzburg; Mr. B. Goldberg, Durban (in quantity); Winkel Spruit Experiment Orchard; Mr. W. W. Cato; Messrs. S. Todd & Sons, Town Bush Valley; Mr. W. Thompson, Lower Umkomaas; Mr. Y. E. Shire, Duff's Road; and Mr. Pardy.

Apples.—Messrs. S. Todd & Sons, Town Bush Valley.

Pears.—Messrs. D. A. English & Co., Town Bush Valley.

Plums.—Mr. Hopkins and Mr. C. F. Ford, Maritzburg; Mr. W. Struck, Ennersdale; Mr. G. F. Walters, Chase Valley; Mrs. E. T. Mullens, Mountain Rise; and Mr. P. H. Campbell, Chase Valley.

Peaches.—Mr. W. Struck, Ennersdale, and Mr. W. Merritt, Richmond.

Grapes.—Mr. C. F. Ford, Maritzburg, and Mr. D. C. Slatter, Weenen.
Bananas.—Mr. F. L. Goble, Clairmont; Mr. Vincent Seymour; and the Winkel Spruit Experiment Orchard.

Tender Fruit, other kinds.—Mr. W. H. James, Zwolle (lemons); Mr. P. H. Campbell (citrus kinds); Mr. S. C. Hawksworth, Equeefa (citrus kinds); Capt. Montgomery, Ismont (lemons); F. L. White, Durban (litchies); Messrs. Bazley Bros. (citrus kinds); and mangoes from Messrs. F. L. Goble, Clairmont; A. Dryden, Pintown Bridge; and V. Seymour, Malvern.

Fruit Unclassified.—Messrs. F. L. Goble, Clairmont; G. Richards, Mooi River; C. F. Ford, Maritzburg; H. Gazzard, Bulwer; and V. Seymour, Malvern.

Do Cows Require Salt?

IN a recent Wisconsin Experiment Station report Dr. S. M. Babcock gives an exhaustive review of the numerous experiments conducted to determine this question, and also submitting data secured in three trials, two of which were carried on for a year. The earlier experiments were conducted for only short periods, and we are not surprised to learn that they were misleading, and, in fact, of no value whatever. The salient points of the summary are the following:—

"In every case the cows exhibited an abnormal appetite for salt after having been deprived of it for two or three weeks, but in no case did the health of the animal, as shown by the general appearance, the live weight, or the yield of milk, appear to be affected, until a much longer time had elapsed. This period of immunity varied with individual cows from less than one month to more than a year. In every case there was finally reached a condition of low vitality in which a sudden and complete breakdown occurred, from which recovery was rapid if salt was supplied. This stage was marked by appearance, lustreless eyes, a rough coat and a very rapid decline in both live weight and yield of milk. The breakdown was most likely to occur at calving, or immediately after, when the system was weakened, and the flow of milk large. In general the cows giving the largest amount of milk were the first to show signs of distress. They all suffered less in pasture than when confined to the stable.

"The success in these experiments must be chiefly attributed to the exceptionally long periods during which salt was withheld. In no previous tests, so far as the writer knows, have cows been deprived of salt for more than thirty consecutive days, which period is shown to be entirely inadequate, under conditions which exist at this station. The twenty-three cows that were deprived of salt in our trials all continued for more than sixty days and several before any noticeable effect upon their physical condition or yield of milk occurred."

It is calculated that about three-quarters of an ounce of salt is required per one thousand pounds live weight to sustain the animal body, and that in a general way six-tenths of an ounce of salt is required for each 20 pounds of milk given.

Co-Operation.

By E. T. MULLENS, Sec. Min. Agr.

IN days of old, when books were scarce and means of intellectual amusement in winter evenings were scarcer still, the monks amused themselves with dialectics, choosing for their argument such theses as, "How many spirits can stand upon the point of a pin?" or, "Which came first—the fowl or the egg? If a fowl, how could a fowl come without a pre-existing egg. If an egg, how could an egg come without a pre-existing fowl?" I have chosen as my thesis for the present paper this, that co-operation after all is merely "the intelligent exercise of common sense." I do not propose to weary my readers by formally arguing the case; but will illustrate my meaning.

Primitive man did everything for himself, that is, when anything required to be done, which was, as a rule, but seldom. He gathered flints, chipped them, bound them with strips of hide to bits of wood; and thus made for himself battle-axes, knives and tools. For clothes—which he wore more as a matter of ornament than for the sake of warmth or decency—he slung around himself the hides and skins of slaughtered animals; and, for abode, constructed with his own hands rude huts out of branches, bark, grass or hides, as the circumstances dictated; or else crept into caves or hollows roughly carved out of hill-sides with picks made of the antlers of the elk and reindeer. This was the age of extreme individualism so far as labour was concerned—the age when free in woods the noble savage ran—the savage with disgusting habits and murderous instincts, concerning whom it was once the fashion for poets to rave. The savage, however, occasionally found, when he had an excess of meat as a result of chase, that he could save himself the labour of making weapons for himself by exchanging some of his surplus from the chase for weapons made by others; and he who had a surplus of chipped flints, found he could save himself the trouble of hunting, by exchanging some of his flints for the produce of the chase. By these means, the savages were able to pander to their laziness and at the same time to enjoy the fruits of other men's labours; and, this exchanging becoming popular, there gradually arose a system of barter which was the commencement of what may be called "instinctive or unconscious co-operation."

Little by little first primitive man and then uncivilised man thus built up the whole fabric of modern society, which is founded on co-operation—not conscious, intelligent co-operation but unconscious coercive co-operation of the kind which led the poet to exclaim that things were in the saddle and rode mankind. Regard, for instance, the present day form of unconscious co-operation involved in,

say, the manufacture of a pin or a nib, which is carried out entirely by machinery and requires the co-operation of so many individuals to produce the complete article; or regard, for instance, the number of persons whose unconscious co-operation is required before a loaf of bread can be placed on your table. The land must first be prepared for cultivation, and, to do this, plows and harrows are required in the production of which, commencing at the mines and ending with the railway transport, the services of countless numbers of individuals were given; then, there are the farm hands who look after the growing corn; the carriers to the mill; those who manufactured the wagons, etc., for the carriers; the miller, those who manufactured the machinery for the miller and built his mill for him; the merchant: and those who built his offices and helped to conduct his business; the baker; and those who built his premises and manufactured his ovens; and the guardians of law and order who enable all these individuals to carry on their work in peace and safety.

The number of people unconsciously co-operating to produce even the simplest articles for our daily use is almost incredible; and it is co-operation alone which has enabled us to reach the state of civilisation or semi-civilisation to which we have at present attained.

Man, however, is always observing and studying the laws which govern the universe, and then, from such observations and study, is constantly endeavouring to intelligently direct those laws to his own good. By studying and observing the laws which govern the forces of steam and electricity we have been enabled to make those forces our servants instead of our masters. Co-operation as usually conducted under our system of modern society makes slaves of men and crushes their souls until they come to be regarded almost as parts of the machinery which they control and as of not much more account. The revolt against this state of affairs leads us to socialism and anarchy; and raises prominently the question as to whether we shall allow ourselves to be carried along the current without attempting to see where we are being carried, or shall seize the rudder and endeavour to intelligently direct our course along the turbulent stream of life. A study of the laws of unconscious co-operation shows us that we have the power to intelligently direct co-operation to our own good; and this is what is now being done under what may be called the new system of co-operation.

Not to go into too much detail, the origin of the new system of co-operation has been this *thought*, that since we are forced by the necessities of modern society to co-operate for the satisfaction of our daily wants, why not co-operate in such a way that we shall all reap a proportionately equal share of the benefits of such co-operation instead of allowing middlemen and capitalists to use that very system of co-operation to unduly enrich themselves at our expense. Co-operation in this new phase was at one time preached by

Robert Owen and other enthusiasts as a religion which should transform the world; and I myself believe that this intelligent co-operation *will* prove to be one of the factors regenerating the world. Just as, in the old days, the Christian religion spread and proved a success amongst the common people until it forced itself to be adopted by the rulers of those days; so is intelligent, conscious co-operation spreading among the common people now, and forcing itself more and more upon the attention of the powers that be. The moral uplifting thereby of some communities formerly regarded on the Continent as mainly composed of loafers and thieves is almost marvellous.

Under our modern system of unconscious coercive co-operation, the possession of capital gives the holder thereof undue advantages. The worker becomes a part of the machinery with no more rights than the machines themselves, and equally as liable to be flung on one side when worn out by old age or damaged by accident. His share in the result of his labours is limited to the amount of wage he can force his employer to give him; and no matter how excessive the profits may be, the whole goes to capital. Conscious, intelligent co-operation places the worker in the position of being able to hire capital, so that capital thereupon becomes a servant instead of a tyrant. The banding together of a number of honest, reliable men enables them to offer their joint character and the whole of their resources (small individually but considerable collectively) as security for capital. This can be obtained at a fixed rate of interest, representing its hire. The hire once paid for, the remainder of the net profits are then available for distribution amongst the workers.

Here I would like to make a clear distinction between co-operation proper and joint stock companies, concerning which there seems considerable confusion in the minds of Natal farmers. The tendency at present is not to form true co-operative societies but to drift more and more towards joint stock holding. A joint stock company is an organisation in which anyone can take shares, whether he be a farmer or a townsman, whether he be interested in a particular industry or not, and is generally regarded as an investment—the more dividend earned the better. At first probably all or nearly all are interested in the particular creamery, factory or whatever is to be started; but, sooner or later, it is inevitable that the shares will pass into the hands of those who want dividends—the larger the better. The interests of the shareholders become then not those of the suppliers or workers, and, instead of one capitalist grinding down his employees and taking all the advantage he can of those from whom he buys, you frequently have an even worse position, because the managers of the company generally are employees and are liable to lose their positions if they do not respond to the demands for more and more profits. It is notorious that companies have no souls to be damned and no bodies to be kicked; and some of the worst employers are joint stock companies. The formation of joint stock companies may be

worthy of encouragement in cases where that is the only method of obtaining the capital—better some form of industrial co-operation than none at all; but, wherever it is possible, the duty of an agricultural department is to preach and to encourage the formation of co-operative concerns.

The true co-operative association is that in which the interests of all are identical. Capital is hired, at a fixed and low rate of interest; beyond that of receiving the fixed rate of interest (which must be reasonable and never exceeded), the shareholders, who are usually limited to those actually dealing either as suppliers or consumers with the association, have no claim as such. After the payment of interest on capital and provision for a reserve fund, the net profits are divided into three or four portions, the proportions of which may vary according to circumstances but should always so far as is possible be equal. One portion goes to the suppliers (in the case of creameries, etc.); one portion goes to the customers or consumers (*i.e.*, those to whom the goods or work is supplied); and one portion goes to the employees. Sometimes, a fourth portion is devoted to establish funds for provision against sickness, old age pensions, or general charitable or public purposes. The interests of the suppliers are, of course, secured by the share offered them in the profits; the more they supply, the more their profits. The interests of the public are secured by their share in the profits; the more they buy of this particular association, the greater the amount standing to their credit at the end of the year. Although we have instances of co-operation in Natal where the interests of both sellers and buyers are secured in this way, I have yet to learn of one where the interests of the employees are also thus secured. Yet, after all, who can effect the economies and generally promote successful business so well as contented employees? The granting to employees of their right to an equal share in the profits is more than an act of justice: it is sound business economy based on experience; and until the employees obtain their share in the profits we shall never attain that success in co-operation of which all its original promoters dreamed, and which I personally believe it is capable of achieving.

The industrial millenium, by which is meant, of course, the industrial ideal, which will be brought about by such co-operation, is easily conceived in outline, and not difficult to describe in general terms. It is, according to one writer, "an industrial condition, in which life is the end of labour and labour is the means of life. Every man is at work in the best way at what he can do best, for the good of all and not for private profit. Labour and capital are at peace, for all are labourers for a common end, and capital is but the means of making the common labour effective. Material resources are husbanded, and labour is employed and directed with but one end in view, the attainment of the maximum quantity and quality of human life."

No clearer illustration of the power of the co-operative movement and its future possibilities could be given than the following extract from an official bulletin of the French Department of Agriculture issued last year:—

"The Grand Duchy of Hesse-Darmstadt is to-day the undisputed capital of the German co-operative agricultural movement. It is at Darmstadt that is situated the seat of the Imperial Union of German Co-operative Societies, with which was amalgamated, in the beginning of the year 1905, the General Union of Rural Co-operative Societies, sitting at Neuwied. This act united in a single grouping two powerful central banks, 40 national or provincial unions, 68 central co-operative societies, and 15,650 agricultural co-operative societies, comprising 1,200,000 members. M. Haas, its organiser, is the president of this agricultural republic, and it is from Darmstadt that co-operative thought is diffused through all the German countries and even through the German portions of Austria, which has created its agricultural organisation upon the German plan."

Some of the most powerful co-operative societies of England arose in very simple ways. The Civil Service Stores, for instance, arose out of the combined purchase of a chest of tea by a small number of civil servants. The price per lb. at which they were enabled to take over the tea as a result of the combined purchases of the chest was so low, as compared with the ordinary retail price, that it led to the combined purchase of other chests of tea and articles of daily consumption till the work became too great to be undertaken by the civil servants themselves and they had to appoint someone to make their purchases for them. At the present day, the Civil Service Stores is one of the wealthiest corporations in England. Its success is due to the fact that it supplied a want, and was the intelligent exercise of the combined common sense of the Civil Servants. At the same time, I must remark that this corporation is now a joint stock company, not a proper co-operative association.

I could multiply instances of successful co-operation *ad infinitum*; but will conclude with one to be found in Natal itself.

Only too often is it the case that our mealies are disposed of to the middle-man who travels round the country dealing with each farmer separately, haggling, depreciating, and beating down the price, setting one farmer against another, and, finally, disposing at a huge profit to himself of the mealies which he had so succeeded in obtaining from the farmers at ridiculous prices. The farmers in the Dalton district of the County of Umvoti, by an intelligent exercise of common sense, decided not to continue to sell their mealies at ruinous prices in this manner. Accordingly, they talked the matter over; and engaged a man at a salary of £500 a year to keep himself in touch with the market and dispose of their produce for them to the best advantage. It was a bold step to take

to pledge themselves to pay this salary; but co-operation paid them from the very commencement. The consequence is that they can always rely upon disposing of their produce at top prices, they can afford to pay the salary of their manager, and still receive far more remunerative prices for their produce than they ever did before they had what to many farmers appears an expensive organisation. I hope in the May issue of the *Journal* to publish an account of this society's operations.

My object, in brief, has been in this article to show that, like the man who discovered he had been talking prose all his life, we have been, and are, daily acting in co-operation not only with one another but with countless individuals scattered all over the world: that this co-operation is unconscious and coercive, and in many cases reduces us to parts of machines; and that, by acting together in conscious, intelligent co-operation, we may not only better our own physical and moral well-being, but shall be doing our best to help forward that industrial millenium which, however visionary it may seem, must appeal to everyone as most desirable even if most improbable.

An Octogenarian Farmer.

INTERVIEW WITH MR. WM. TAYLOR.

By ERGATES.

A WELL-KNOWN and highly-respected name among farmers in the "midlands" is that of Mr. Wm. Taylor, of Fordoun, Nottingham Road. The cheerful hospitality of Fordoun in the pre-railway days was enjoyed by many—myself among the number—and at the many country-side meetings the late Mrs. Taylor was always a most popular hostess. In everything that made for the amenities of country life Mr. Taylor and Mrs. Taylor were always in the forefront. He has now given over the farm—6,000 acres—besides two Thorn farms, to his sons. His four score years weigh lightly on him, for he is still active in mind and active in limb. About the farming problems of the present day we did not speak at length, but about his early experiences we conversed much. They tell of great difficulties successfully surmounted, and will no doubt be read with general interest. Of the 52 passengers brought by the 'Herald' in 1850 there are now only three alive; Mr. William Taylor, Mrs. Bishop, Durban, and her son, a child in arms at the time. The story, as told, is the outcome of many questions.

NATAL IN 1850.

"I come," said Mr. Taylor, "from a Kincardineshire family of farmers. When I was about three-and-twenty it seemed to me that I"

could do better for myself if I were to emigrate. I gave some thoughts to America, where two of my uncles had gone, but a glowing account in a local newspaper by a Mr. Lidgett—after whom Lidgetton is named—about the attractions of Natal as a farming country induced me to come out here. From the barque 'Herald,' of 405 tons, I landed at the Point on 1st June, 1850. In addition to my personal luggage I brought about a ton of farm implements, including a Scotch swing plough, which I yet have. Of money I had but 4s. 6d., so closely had I invested my small capital, but with my farm training I was handy, and at that time and for many years afterwards, I hardly ever knew what it was to feel tired. The Customs House then was a very small shanty, and all our luggage lay outside it on the sand for several days. The road to Durban was cut through the bush just the width of a wagon. I tried my best to get work immediately. A man offered some small pay if I would drain off a big pond of stagnant water where the Castle Arcade now is. I did not see how the water could be led off, and, as the pay would be contingent on success, I did not take on the job. The skipper of the 'Herald' wanted hands to work out the cargo, and I was glad to be taken on for a short time at 4s. 6d. per day. After a spell of looking for work without success, I joined Mr. Robert Anderson, the surveyor, as an assistant at 4s. 6d. per day. I had had a little training at surveying before I left Scotland, and, besides working with him in the field, was able to help him in the preparation of the diagrams by candle-light at night. That lasted for several months and I saved money. I ought to mention that we immigrants under the Lidgett scheme were entitled to half an erf in the township of Lidgetton and to 20 acres of its commonage. Only a few took advantage of the gift—at that time valueless. I, however, had my plots beacons off and allotted. The railway went through my half erf and bought it, and the other 20 acres I still have.

TIMBER SAWING.

"Nothing further offering in the way of wages, I went timber sawing, first going to the Umlaas bush. The work was hard and the returns poor. A load—800 feet of yellow-wood plank one foot broad—would sell in Maritzburg for £3 cash, or in goods £4. Out of this £2 went in transport; then there was the kafir under-sawyer to pay, the digging of the pits, the felling of the trees, the getting of them to the pits, the sharpening of the saws, the £1 month license, and so on. Many, including myself, suffered badly from Natal sores. The work, as I said, was hard, indeed, under the conditions, it was slavery; both before and since then I have worked hard, but never as I wrought in those days. There was no choice; slave or starve. After a couple of years I moved to the Blesbok bush, where I began to do a little dealing in stock. The Transvaal and Free State Boers in the autumn came down to Maritzburg with wool, skins, kwips of butter and dried peaches, and to get re-

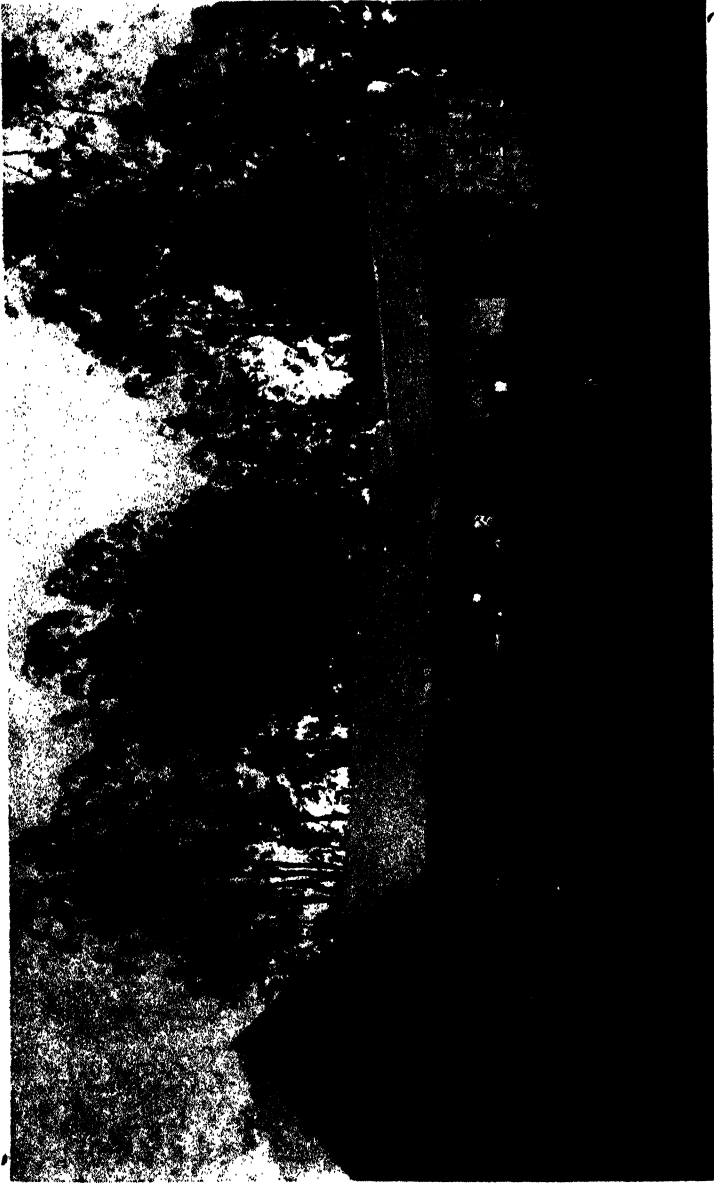
turn loads some of them came to the Blesbok bush on their back journeys. For a load—40 twenty feet planks—they would give a good ox or a horse. The horses were often very good, the only fault against them being that, as a rule, they were “round-loopers,” or strayers. In this way—by swapping—I eventually got together a span and a wagon, being eager to go trading trips. A trip to Pondoland was unfortunate. The goods, which were supplied to me on credit, for the greater part proved unsuitable. I came back with 52 head of cattle, but lungsickness broke out among them and all died except six, and, in order to pay for the goods, I had to sell my span of salted oxen.

FORDOUN.’

“After two or three years more of sawing, I managed, one way and another, to get together a small troop of cattle and a few mares and to run them on the farm ‘Lyndoch’ I went to work for the owner, Mr. John King, the father of Mr. James King. While there, Governor Scott, who was on a tour through the Colony, called, and passed the night. During the evening the Governor said to me that the time for giving grants of land would end in a week or two, and suggested that I should apply for one. Land was so cheap then and money for survey fees so scarce that I had never before given the question any consideration. However, I sent in an application, and, on my return from a trading trip to the Free State with timber, I found that 3,000 acres had been beacons off next to that of my friend, Mr. King, of Lyndoch. I gave to my grant the name of my native parish in Kincardineshire—Fordoun. By the way, the wagons in those times were very different from those of the present day. The axles were of wood—ironwood—and the load was only 2,000lbs. The present screw was invented by a Mr. Ryley, a member of the then Legislative Council. For going down a steep hill a shoe was used, and every wagon had two chains for locking the after-wheels when necessary.

FARMING IN THE SIXTIES.

“On the farm I soon put up a shanty, and, despite occasional outbreaks of lungsickness, my cattle did well. Cattle in those days, however, did not represent much money. First-class oxen were worth only £4 a head. At hut-tax paying time I have seen Ferreira, the Maritzburg auctioneer, knock down the best native oxen at 16s. or 17s. My horses also did well, but they again did not represent much money. For my best colts I got only £12, colts that sell now at £30 or £40. My horses, as you know, had a good reputation for many years, and fetched high average prices, but some fifteen years ago, as the land got more occupied and they could no longer range as far as they were inclined, they began doing badly. I was advised to give the farm a rest for some years. I did so, and now they are doing well again. Wild animals were plentiful in the early days. Jackals were numerous, and the noise they made



NATAL HOMESTEADS.

"Fordoun." Mr. William Taylor.



at night around the house often made it difficult to get to sleep. There were also stray lions which did mischief. I was a sufferer only once. On riding back from town on one occasion and after nightfall, when I had got about a mile from the house, my horse suddenly took fright. On the following day I found at the place where the horse had been frightened the half devoured remains of one of my troop horses. We in the neighbourhood got up occasional hunts, and invited the officers from the Maritzburg garrison up to help, but I cannot remember of any success. About a mile this side of Dargle Road Station a sea-cow was shot by a half-caste called 'White Joseph.' Soon after going on to the farm—1862—I made one of the party under the late Mr. Proudfoot, of Riet Vlei, raised for punishing the Bushmen. The account of the expedition given to you by Mr. Robert Speirs was very correct. On my return home I called at the house of my friend, King, and, although anxious to get to the farm, they persuaded me to stop the night and tell them all about the adventures of the little force. There was a storm during the night and my house was set on fire by lightning and everything in it was burnt. That was the second time I was burnt out. The first occasion was at the Blesbok bush. The house was of wood and it caught on fire one Sunday while I was walking over to call on a friend. When a short distance away I heard shouting, and turning round I saw smoke, and I felt sure from the position that my house was on fire. Inside the house were two loaded guns, and in a chest were two flasks of gunpowder, 52 sovereigns, and two or three pounds' worth of silver, and piled round the house were quantities of shaped wagon timber for sale—the most of my summer's work. When I got back the fire was burning was burning furiously. I heard the guns go off and then the powder flasks. Next day, when I could search, I found all the sovereigns on the ground uninjured—the explosion of the flasks had distributed the coins—but the silver was melted into a solid lump. I was great friends at that time with the Speirs' family, among whom was the present Robert Speirs, then a lad, and to him I gave the lump.

PUBLIC SPIRIT REWARDED.

"In those early days there were no proper police. One day six or seven of we neighbours met at Boschfontein, Gert Naude's farm—now owned by Messrs. Hutchinson—for the purpose of making arrangements for building a laager. There was some native unrest at the time. While we were talking over the matter news came that seven native prisoners had broken out of the Maritzburg gaol and were not far away. We soon saddled up and tried to surround the runaways where Mr. Joseph Raw's farm now is. Hodgson—the man who was accidentally shot in the Bushmen's expedition—succeeded in finding one. The rest got away; the sun was already going down. Hodgson called on the native to surrender. He would not but showed fight, and when he had got his assegai

in position for throwing Hodson shot him. We then drew up a report of the business and sent it to the Maritzburg Magistrate—I think the late Mr. John Bird—and to our general astonishment and satisfaction we shortly afterwards received, each of us, a cheque for a pound from the Government.

LABOUR.

“For a long time the question of labour was most difficult; I had not then bought my two Thorn farms. This cold district was in those days shunned by kafirs wanting work. I was among those to whom coolies were allotted from the first shipments. By that lot I learnt some of the characteristics of coolies. We were greatly pleased with one of the women who worked occasionally in the house. One day another woman of the gang rushed up to me excitedly handing me six sovereigns, and gave me to understand that the husband of the woman who was giving so much satisfaction had lots of my money. At that time I had, secreted carefully in a wardrobe, £195 in gold, which I had not had an opportunity to bank. I soon found that forty odd pounds had been taken. I searched the man and, except £7, found all the missing money. In this way I got a lesson of their prying nature as regards all their master’s personally belongings, and an example of their readiness, under certain circumstances, to give each other away.”

So much for the earlier life of this octogenarian Colonist. With first-class, trained ability, a splendid constitution and physique, lots of grit, and exceptional powers of self-restraint in husbanding his small early profits, he succeeded. With him, as with most, it was the first step that counted. Thereafter all went as smoothly and easily as farming in Natal can be expected to go. The farm Wellington, which adjoins Fordoun, he bought from the Land and Colonisation Company, besides buying Thorn farms. His success is that of genuine farming; he never had a pound in shares, and, what a good many farmers cannot say, he never borrowed money on his land.

Wellington, which adjoins, is now farmed by Mr. Taylor’s son, Mr. W. F. Taylor, and Fordoun by his son Mr. Bruce Taylor. The land of Fordoun is poor for cultivation and requires much manuring for all kinds of crops. To get, say, seven muids of mealies per acre, Mr. Bruce Taylor told me he would require about 700lbs. of superphosphate, or about 10 cwt. of basic slag. He now only grows mealies for ensilage, and finds it cheaper to buy the mealies and meal he wants. Indeed, for ensilage he prefers millet, as giving him a heavier yield per acre. As he does not expect to be able to send his stock to the Thorns this winter, he is putting in as much feed as possible, millet, etc., for ensilage, forage, roots, ryegrass, etc. *Paspalum dilatatum* will not, he says, succeed in this high veld. Mr. Bruce Taylor owns the thoroughbred entire “Nottingham,” 1903, by “Gallinule.” “Gallinule” was the sire of the winner of last year’s Derby—“Pretty Polly.”

Devonshire Cream and Soft Cheese Making.

THE following is published by the British Board of Agriculture:—In some parts of the country, during the summer months, a surplus quantity of milk is produced for which very low prices have to be accepted from the wholesale dealers. Any means of diverting this surplus into more profitable channels will tend to raise the value of the yield as a whole. The manufacture of clotted cream and soft cheeses may frequently afford an excellent opportunity for utilising such milk.

It must be remembered that both cream and soft cheese are regarded as luxuries by the majority of people, and are therefore only bought occasionally. Consequently, it is advisable to place on the market small quantities at a time, and to fix the price at a moderate figure. The best demand is to be found at seaside and country health resorts, where fresh farm-house produce, properly made and packed, commands a ready sale during the warm weather. No great outlay is required for soft cheese making, and even small quantities of milk may advantageously be used in this way. The varieties described below are among the easiest to make.

ACCOMMODATION.

The room used for cheese making should be one in which the temperature can be controlled to some extent. A temperature of 62 deg. F. in summer, and 65 deg. F. in winter is desirable, as too much heat produces too rapid drainage of the curd, and too low a temperature results in a wrongly fermented cheese.

THE MILK.

A pure rich milk produces the finest cheese. It is not possible to make first class cheese from stale or acid milk, as the curd drains too rapidly. In some varieties of cheese the curd is cut or sliced in large pieces, the object being to retain much of the moisture; the smaller the curd is cut the more rapidly the whey drains off.

RENNET.

This is a substance which contains a chemical ferment having the power of coagulating milk. When milk coagulates the casein is precipitated, and the fat becomes mechanically entangled in it, the whole forming the curd. Reliable rennet solutions of a very concentrated nature can readily be purchased, and are usually employed, after dilution with cold water, in the manufacture of soft cheese. Rennet solutions should be kept in a dark, cool place, preferably in stone bottles, as the light weakens the action of the ferment. When of good quality rennet is clear, of a light straw colour and nearly odourless. Rennet in the form of powders and tabloids is often used. For hot climates and where rennet is only occasionally required, the tabloids are preferable to the liquid rennet, as they are always of uniform strength and do not deteriorate when kept.

APPLIANCES.

Tubs.—Wooden tubs fitted with lids, though not essential, are a

great convenience. Wood is a bad conductor of heat, and is therefore most useful in maintaining the milk at an even temperature during coagulation. A falling temperature causes the cream to rise, involving much loss of butter-fat in the process of cutting the curd. Oak is preferable on account of its hardness and close texture, and it is most readily cleansed after use. In very cold or very hot weather an earthenware or tin vessel containing the milk may be set within a large wooden tub containing water, which is heated or cooled according to the temperature at which it is desired to maintain the milk during coagulation. This temperature varies with the class of cheese made.

Pipette.—A measuring glass or pipette is necessary to ensure accuracy in measuring out the rennet. One marked in cubic centimeters (c.c.), subdivided into ten parts, is the simplest form of measuring instrument to use. The comparative measures are as follows:—

3.55 c.c. (or, roughly, 3.5 c.c.)	...	... =	1 dram
1 c.c. ...	...	... =	17 minims
60 minims or drops	...	... =	1 dram
8 drams	...	... =	1 ounce

Draining Table.—The draining table should have a slightly sloping surface, and be provided with grooved channels for the whey to run off. Hard wood or slate is a good material for the table top.

Scoops and Moulds.—A metal scoop or spoon for cutting the curd is also required, as well as moulds, which are usually made of tin, but sometimes of wood. These can be bought at a low price according to the variety of the cheese.

Cloths.—The cloths required for draining the cream should be of fine, medium, and coarse texture. They are made of bleached linen, the finest quality of which costs about 1s. 6d. a yard.

Boards, Mats, Paper, and Thermometers.—Among the other articles which will be wanted are boards 14in. by 8in. by $\frac{1}{2}$ in. in thickness, which should be made of hard wood, of such a nature that it will not impart any flavour to the cheese; straw mats, which can either be purchased ready made or made at home by threading together coarse wheat or rye straw; greese-proof paper, cut to a suitable shape for the particular variety of cheese; a wall thermometer to record the temperature of the making room; and a floating thermometer, which has been accurately graduated, for use with the milk and curd.

Salt.—The salt used should be pure, free from grittiness, and readily soluble.

VARIETIES OF CREAM CHEESE.

Cream cheeses may be made of two qualities: (1) Those made from double or very thick rich cream; (2) those made from thin cream, or cream to which a portion of milk is added.

Double Cream Cheese.—For the manufacture of this cheese thick cream is necessary. If the milk is separated, the separator should be regulated so that the milk yields 6 to 8 per cent. cream; or, in other words, 6 to 8 lb. of cream from every 100lb. (roughly, 10 gallons) of milk passed through the separator. The cream as obtained from the separator should be cooled to 60 deg. F. in summer, and 65 deg. F. in winter, and then placed in a fine-textured linen cloth, previously rendered sweet and clean by thorough scalding with boiling water. Sweet shallow-pan cream may also be used, and is treated in a similar manner. The

cloth is best laid in a basin, and the cream poured into it, after which the four corners of the cloth are taken and tied together, so that it resembles a bag containing the cream. It is better not to put more than 1 gallon of cream in the cloth, as drainage is not easy with more than this quantity of fine salt mixed with it preparatory to moulding; this will should be hung up in a cool dry place to drain. Three times a day the cloth ought to be opened out and the sides scraped to remove the stiffened cream in order to facilitate drainage. At the second scraping down the cream should be transferred into a fresh cloth. It is sufficient if the cloth is changed once only, though if done more frequently rather better results are obtained. The cream will be sufficiently drained in about two days, but the process may be accelerated by opening out the cloth and scraping down frequently, and by placing a small weighted board on the cloth containing the cream. When the cheese becomes of a stiff pasty consistency it should be emptied out of the cloth, and a small quantity, and the cheese is apt to become too sour. The bag of cream bring out the flavour and assist the keeping properties of the cheese. It is customary in some cases to salt the cream, instead of the actual cheese. The cheeses are turned out in square, oblong, round, heart-shaped, and other forms, according to the type of mould used. The cheeses may be removed from the moulds at once and are then ready for sale. They remain in good condition for from one to two weeks. They may either be done up in grease-proof paper and placed in small cardboard boxes, or done up in butter muslin and afterwards wrapped in grease-proof paper, in which case no box is necessary. The cheese sold retail at sixpence is usually of about four ounces weight, and a gallon of rich cream should make about sixteen cheeses.

Ordinary Cream Cheese.—This is prepared from thin cream taken from the separator at the rate of 12 per cent, or from thicker cream to which milk has been added. It should be cooled to 60 deg. or 65 deg. F., and 1 c.c. of rennet added to each $\frac{1}{4}$ gallon of cream. It should be allowed to stand for about 12 hours to thicken, and then ladled into cloths and treated in a similar manner to double cream cheese. This variety of cream cheese contains a much greater proportion of curd, and is not nearly so rich as the double cream cheese.

Gervais.—This is a popular variety of French cheese, made from a mixture of whole milk and cream, in the proportion of two to one. The Gervais is a small cheese, measuring about $2\frac{3}{4}$ in. high by $1\frac{1}{2}$ in. in diameter, and may be consumed either fresh or when of some age. The moulds for this variety of cheese consist of 12 small moulds fixed on one base. To produce 12 cheeses two quarts of warm new milk and one quart of cream should be mixed together by constantly stirring for at least 10 minutes. The temperature of the mixture should then be regulated to 60-65 deg. F., and 1 c.c. of rennet (diluted with a little cold water) should be added. Provision should be made to keep the temperature uniform whilst the curd is being produced. This will take about 12 hours, when the curd may be ladled into a draining cloth of a suitable degree of coarseness and hung up to drain as in the case of cream cheese. It should be treated in a similar manner to cream cheese as regards scraping, etc., and when sufficiently firm should be salted preparatory to moulding. The moulds should be lined with strips of blotting-paper, a special variety of which is made for this kind of cheese.

and then set on a straw mat placed on a board. The moulds should be carefully filled with the curd by means of a bone knife. The curd should be left in the moulds for a short time until the cheeses have become of settled shape, when the moulds may be removed. The cheeses may be loosely packed in grease-proof paper and tied up with ribbon, or placed in cardboard boxes for sending by post or rail. Although Gervais cheese is chiefly eaten fresh, it keeps well for several days after removal from the moulds, and some prefer it at this later stage of ripeness. Gervais should realise from 3s. to 4s. per dozen.

Devonshire Clotted or Scalded Cream.—Though originally confined to the counties of Cornwall and Devon, the manufacture of clotted cream is now carried out most successfully in practically all countries. In addition to its having gained a great reputation as a luxury, it is now largely recommended by the medical profession as an excellent fatty food, and is displacing to some extent the use of cod liver oil amongst invalids. Devonshire cream is very rich, containing from 50 per cent. to over 60 per cent. of fat, and this fat is of a more digestible kind than any other, being present in the cream in a finely emulsified condition. In the preparation of clotted cream it is desirable to use rich milk, such as is produced from the Channel Island breeds of cattle, but this is not essential, and the evening's milk from Shorthorn cows will produce very good cream indeed. In Devon and Cornwall clotted cream is largely made from the milk of Devon cattle, which are admirably suited for the purpose. Crosses with Channel Island cattle are also commonly employed.

The cream is prepared as follows:—

1. Whole milk, warm from the cow, is carefully strained into setting pans. The pans are most suitable for the purpose hold about six quarts of milk, measuring 15 in. across the top, 7 in. in depth, and 11 in. across the bottom; they are, in fact, similar to "shallow pans," only deeper.

2. The pans of milk are left undisturbed in a cool dairy for the cream to rise. In summer, twelve hours or less is the time allowed, but in winter twenty-four hours is usual.

3. The pans should now be carefully removed and scalded, great care being taken not to disturb the cream on the top of the milk. Scalding is carried out by placing the pans on a hot-water stove, and allowing steam to play upon them until in not less than half an hour's time they have attained a temperature of 175 deg. to 180 deg. F., when they are removed, and either allowed to cool naturally, or are cooled by placing them in a stream of cold running water. The scalding should not be done too quickly, otherwise the characteristic scald flavour is not produced. The heating may be carried out by placing the pans on a kitchen range or hob, but the hot-water method is preferable.

4. When cold the cream may be taken off in a thick clotted condition, and is ready for sale. In summer it is especially advisable to cool the pans as quickly as possible after scalding, as this ensures extra keeping properties.

The cream is generally sold by the pound. One pound of cream may be obtained from 1½ gallons of Jersey milk, or less; whereas nearly 2 gallons of Shorthorn milk may be required to produce the same quantity of cream.

Natal Botanic Gardens.

THE FIBRE INDUSTRY.

THE following is Mr. Medley Wood's latest report on the Botanic Gardens:—I have to report that, in consequence of the very favourable weather, the plants in the Gardens are in the best condition, and no appreciable damage has been done by the weather, cutting up the walks by heavy rains alone excepted. For the second year in succession the mango crop has been a complete failure, scarcely a single sound ripe fruit having been seen, and the cutting down of a number of the trees would seem advisable. Advantage has been taken of the favourable season to put out a number of palms and other plants, and there are still more to be planted.

I have lately had numerous applications as to fibre-yielding plants, and am pleased to know that this industry is now fairly commenced in several places, and I hope that in a few years' time Natal will be exporting this product in considerable quantity. As there appears to be some amount of ignorance about these plants, and as incorrect statements have been made, I think it well to allude shortly to the subject. There are three species of fibre-yielding plants to which planters should, for the present at any rate, confine their attention. First, the *Fourcroya* (*Furcraea*), commonly, but incorrectly, known as an aloe. This is the plant which is largely grown in Mauritius, and the product is known as "Mauritius hemp." Of this plant, bulbils in quantity can be obtained in the Colony. Next comes the "sisal hemp." This is yielded by a plant very similar in appearance to the *Fourcroya*, but the fibre is of a better quality. It is the plant which is so extensively cultivated in the West Indies. It has been stated that this plant is being grown in quantity on the East Coast, but this is, I think, a mistake; and it has also been said that neither bulbils (seeds) of this plant are obtainable in the Colony, nor from abroad, the fact being that in the year 1890 we received from Kew 20 plants of *Agave rigida*, var. *sisalana*, which is the correct name of the plant. These are very small plants, and came by parcels post, and they suffered considerably on the voyage, but most of them were reared. After that we received a larger consignment, which were sent in a box, and forwarded by a parcels agency, but of this lot we did not rear a single plant. The 20 plants first received, or their progeny, have now been in the Gardens for 17 years, but until this season there has been no demand for them, except that some were given to the late Mr. Watt for planting at Umzimkulu. During the present season about 2,000 plants and cuttings have been sent out to applicants, and more will be supplied as the bulbils are produced. The last plant worthy of notice in this respect is *Sansevieria guineensis*, the fibre from the leaves of which is commonly known as "bowstring hemp." We have in the Colony at least two other plants of this genus, viz., *S. thyrsiflora*, known to the natives as "skogoloti," but the leaves of this species are too short to be of much value, though the fibre is good and strong. Another species was found by our Curator (Mr. Wylie) at Somkeli, in Zululand. A few plants are

in cultivation here, but it is as yet too early to give an opinion as to their value, but the first-named one, *S. guineensis*, promises well, and I understand is largely cultivated in other countries. Plants of it may be seen in the Gardens, and I shall always be pleased to meet any person who may be interested in the matter, and to give any information in my power.

I regret to have to say that depredations and breaches of the by-laws are of frequent occurrence, and it will be necessary to take more active measures for the protection of the property of the Society.

In the Herbarium work is being carried on as usual. A large number of specimens have been received and mounted, including a fine lot of 1,350 Mexican plants, nearly all of which were new to us, and some of them are new species. Also, about 700 European plants, all of which will soon be in their places in the cabinets.

Three new Natal plants have been described, viz., *Berkheya macrocephala*, *Cliffortia Natalensis*, and *Helichrysum Argentissimum*. The description of these plants will shortly be published in the *Kew Bulletin*.

The "Handbook" to the Natal flora is now in the printers' hands, and well advanced, and it will, I hope, be published in a few weeks' time.

Highflats Farmers' Club.

THE following is taken from the Annual Report of the President of the Highflats Farmers' Club, Mr. H. W. Chick:—

The past year's work of the Club has not been heavy. We shall have more to do when we have railway connection and this district goes ahead, as it undoubtedly will. Stock generally has done well during the past year, I believe. I have not heard the results of the local wool sales, but I have no doubt that the painstaking way in which this industry has been worked has met with the usual gratifying result and that Highflats wool has maintained its premier position on the Durban wool market. Agriculturally, there is little to make note of. At present there is not a great deal done in this line, but with railway facilities for getting crops away and of obtaining manures at a more reasonable rate than hitherto I think this line of farming will be greatly advanced. During the past year East Coast Fever broke out in the adjoining county, but, thanks to the Veterinary Department, which took very effective measures with the outbreak, I think I may say that we are much easier in our minds than we were a few months ago. A good acreage of *Paspalum* is being planted this season. This grass has undoubtedly come to stay. Farmers will find it a God-send with early lambs and calves during a late spring. I believe too it will solve the question of a bacon factory, which was mooted a short time back. I find pigs do splendidly on it with a little grain morning and evening. Parts of the district were visited by locusts, and the resulting swarms of hoppers are now being dealt with by farmers. The locust officer has been destroying swarms on Crown Lands and Locations. In conclusion, I thank the officers for their help, and our especial thanks are due to our secretary.

Maize Cultivation in South Africa.

WITH SPECIAL REFERENCE TO NATAL.

By E. R. SAWER, Director Experimental Stations.

II.

BREEDING, SELECTION AND JUDGING OF SEED MAIZE.

THE yield of any given crop of maize is determined by two factors, namely, environment and heredity. The former exerts its influence through the medium of climate and soil, the effects of which are artificially modified by systems of cultivation and manuring; the latter is an innate tendency in the plant to reproduce the characters of its parents, the effects of which are naturally modified by the occurrence in each generation of more or less marked variations from the parent type. The modification of environment by careful cultivation, although a necessary process to successful agriculture, can only be accomplished at considerable expense, and the results, as seen in an increased yield of produce, are transitory; the modification of the plant itself to be effected by directing the natural tendencies of heredity and variation into definite channels is an inexpensive and lasting work, the possibilities of which can be hardly estimated. "Cultivation and care may help plants to do better work temporarily, but by breeding and selection plants may be brought into existence which do better work always in all places and for all time. Plants are to be produced which will perform their appointed work better, quicker, and with the utmost precision. Plant breeding is the intelligent application of the forces of the human mind in guiding the inherent life forces of plants in useful directions."* To cite two instances coming within the everyday experience of farmers, from a single, wild branching perennial (*Brassica oleracea*), found growing on the sea shores of Europe, have been evolved by a simple process of selection cabbage, kale, borecole, Brussels sprouts, collard, broccoli and cauliflower, kohl rabi and ruta бага. Some of these forms have been selected for useful modifications of the leaf, as the cabbage and the kale; others for variations in the structure of the stem, as kohl rabi, and yet others for abnormal development of root, as ruta бага, while in the broccoli and cauliflower advantage has been taken of a peculiar modification in the inflorescence.

In the hands of the plant-breeders, again, the sugar-content of the beet has been increased from four to as much as twenty-four per cent., to which undertaking may be attributed the organisation of an enormous

* Luther Burbank.

industry, the transference of sugar-production from tropical to temperate climes, and the necessity for the re-adjustment of commercial relations by International Conventions.

And the maize plant is no less plastic, for it can be moulded in the hands of the skilful breeder until every character is modified to serve his interests, and an increase in yield of often over 100 per cent. obtained at no greater cost than a study of the nature of the organism and the devotion of a little of the farmer's time to the selection of forms having the desired characteristics. Not a single additional implement is required, nor the expenditure of a single penny in fertilisers or special cultural operations. It has often been stated that seed selection is an undertaking which does not fall within the farmer's province; that it must always remain the function of specialists; that, in other words, a small number of men must retain a monopoly for the sale of seed corn; and that frequent changes of seed are necessary to the maintenance of large yields. The experience, however, of a few seasons devoted to this fascinating work will amply expose the fallacy of such arguments. Many South African farmers have already discovered that the time and labour demanded are negligible; that the seed they themselves secure and select is more reliable and costs them less than the purchased sample; and that the resulting crop yields a better return when bred on and for the particular farm and soil than those derived from purchased seed of doubtful origin.

CROSS BREEDING.

Any system of plant-breeding must conform with precisely the same principles as obtain when live stock is involved. Maintenance of good qualities may be assured by constant selection within a single strain, but the crossing of two distinct types is often resorted to for the purpose of reinforcing effete strains, and for the production of marked variations from which selection is made of new and desired qualities. In this respect the plant breeder possesses an advantage in vast numbers of individuals produced, for a very small percentage yields sufficient seed for the propagation of the new type or types.

The male sex in the flowering plants is represented by the pollen, which in the case of maize is carried by the wind to the "silk" of the ear. At the base of each strand of silk is situated a female organ called the ovule, which contains a female or reproductive cell. These ovules may be seen by opening an immature ear. After lodging upon the silk, which has a receptive surface, the pollen grain buds and produces a long "pollen tube" which passes down through the substance of the silk, carrying with it a male cell, which ultimately fuses with the female cell in the ovule. Cell-division and growth give rise to the seed, which occupies the position earlier held by the ovule. Should the fertilisation of a number of ovules fail to be effected from one cause or another, the ear develops into a body which is popularly called a "nubbin." Self-

fertilisation rarely takes place in maize, for the pollen is developed in male flowers which are collected in an inflorescence, known as the "tassel," at the summit of the plant. This generally matures and the pollen is shed before the ear of that individual plant is in a receptive condition.

Cross-fertilisation is readily effected by planting two selected varieties in alternate rows throughout the breeding plot, and removing all tassels from one or other variety prior to the development of the pollen. Seed taken from the detasseled variety is therefore necessarily the product of cross-fertilisation, the detasseled variety becoming the dam and the pollenating variety the sire of the new hybrid. Pollen is always produced in quantities which far exceed the requirements of the crop, and the removal of the tassel renders a greater amount of nourishment available for the better development of the ear. When a single variety is being grown, the yield of the crop may frequently be considerably increased by detasseling alternate rows throughout the field. The tassel is removed by a single upward jerk and not by cutting. The amount of gain to be attributed to this operation may be determined by weighing ears taken from detasseled and from adjoining entire rows. It is frequently possible to combine by cross-breeding the desirable features of two distinct types of maize. A heavy cropper may have too long a growing period for certain districts, and should be crossed by an early maize with a normally lighter yield. Carefully selected strains from the resulting hybrid may retain to a marked degree the prolific character of the one type and the early maturity of the other, a result rendered possible by the increased vigour derived from "out-breeding."

The breeding plot should be as distant as possible from the main crop or other patches of maize, in order that no uncontrolled crossing may occur. Pollen is carried long distances by the wind, and an interval of a mile is very desirable for the satisfactory conduct of the work. Inter-breeding should always be between varieties of a similar colour; parti-coloured maize has little to recommend it, and generally fails to meet with commercial favour. There is no evidence that colour naturally affects composition or feeding value of the grain, but the better-known yellow types have been subjected to careful selection for many years with a view to increasing their feeding value for stock, whereas the white varieties are demanded for milling purposes and have been bred for starch content. The Mississippi Station compiled in 1895 the yields of white and yellow varieties at seven stations in the central and southern Mississippi Valley. In 1,267 tests with 490 varieties, the average yield of 217 white varieties was found to be 2.5 bushels per acre in excess of the yields of 273 yellow varieties. At only one of the stations (Indiana) have the yellow varieties given the better yield.* This difference is probably due to the facts that the white varieties are typical of southern

* Mississippi Bulletin.

and warmer districts, and generally show a longer growing period with later maturity than do the yellow. At Cedara an effort is being made to evolve by a system of cross-breeding types of white milling maize with long growing period for cultivation in the warmer districts of Natal, and types of yellow feeding maize for adoption in the more temperate belts of country.

SELECTION.

The ear of maize is the breeder's unit, and the first step towards the development of a new strain is the selection of mother ears from the hybridised plants. Before starting work, the breeder must have in mind his ideal plant, ear and kernel, and select closely and rigidly to this type, discarding all plants or ears which do not strictly conform to same. To select one ear for one feature, and a second for another, is to destroy any hope of securing a uniform type, which is the chief end in view. Rigid selection will accomplish more in a few years than imperfect selection during a life-time. The choice of ears should always be made in the field, and partly determined by an examination of the whole plant. As stated above, maize may be bred for tall plants or short plants, for heavy or scanty foliage, for ears tightly or loosely enclosed in the husk, according to prevalence or absence of flying weevil, for ears placed low down or high up to meet the requirements of hand or machine harvesting, for one or more ears to the stalk, and for greater resistance to rust and smut, all of which features can only be controlled by field selection.

It has been a South African experience that the multiplication of ears to the single stalk is not always desirable. On light, sandy loams or poor soils a better nett return may often be secured from plants carrying a single well-developed ear than from those which bear two or more small and stunted ears. In other cases the additional labour involved in harvesting a larger number of small ears more than exhausts the value of a slight increase in weight of grain. On the other hand, a type which regularly sets two or more ears to the stalk will on good, heavy soil generally yield a far larger harvest than a single-eared strain. This point is one which must be relegated to the experience of individual farmers. The character of the stalk is also of considerable importance. Slender stalks are broken over both by heavy winds and by the weight of the ripening ear, which greatly impedes harvesting operations. A tall, slender plant has similarly less to recommend it than a short, stout leafy plant in situations exposed to heavy winds. Where ensilage is an object, broader-leaved varieties may be selected, yielding a larger proportion of fine ensilage. In Natal little damage has been sustained by the occurrence of fungoid pests in the maize crop, although maize-rust is of almost universal occurrence. In Rhodesia entire crops have been destroyed by the abnormal development of this disease, and the relative resistance offered by varieties to infection has become a matter of importance.

After a preliminary selection has been made of ears from plants which conform with the requirements of the ideal type, a further rigorous selection from these will leave the breeder in possession of ten, twenty, thirty or more ears of uniform character, which embrace all the features required in the new strain. Certain points are universally demanded in the ear. It is, for instance, generally acknowledged that a cylindrical shape will yield a greater return of grain than any other, though it is possible that in certain cases the tapering of the tip of a lengthy ear may be a natural effort to still further increase the length, and, as such, to be encouraged rather than eliminated. Until this point is demonstrated, however, it is wisest for the breeder and judge to favour the well-filled, cylindrical tip.

The insistence on regularity of the rows has for its object the avoidance of open spaces between the kernels and consequent loss of weight. It is also desirable that the butts should for the same reason be well filled with grain right into the shank of the ear. As above stated, uniformity of colour is a point of commercial importance, and also provides an index to the care which has been devoted to the work of selection. Upon the shape of the kernel largely depends the amount of grain which can be carried on a cob of given length and diameter. When there is no loss of space and weight the kernels must be wedge-shaped, for it is obvious that this is the only shape which can be fitted closely round the periphery of the circle represented by the cob. The wedge again must be blunt in shape, or a loss of space and weight will ensue where the smaller end of the kernel comes into contact with the cob. The kernels in the row should be closely packed together, so that no movement can be effected by running the hand down the ear. If loose in the row the kernels will often shell out in harvesting, while the spaces between them allow the lodgment of moisture and induce conditions favouring mould and decay in the crib. A compact ear with closely fitting kernels, other things being equal, will give a greater percentage of grain to cob than a loose ear, and, given the same productiveness, the yield of the crop showing compact ears will be greater than from one carrying loose ears.

The tendency among successful breeders has been to aim at a larger number of rows, deeper kernels and smaller cobs. The most popular and widely cultivated types are no longer those with a large, coarse cob and shallow kernels, which were earlier so much favoured. The cob must, however, be large enough to carry sufficient grain to make a profitable ear, and an eight-rowed type may be very prolific if the shape of the kernel leaves nothing to be desired. Performance records are in all cases features to which every prominence must be given, and if an increased percentage of cob be found to give an increased yield of grain per acre, this feature is to be regarded with favour when judging. All white varieties should have a white cob, for the grain is often used for the manufacture of commercial meals, and small particles of a red cob, if mixed in these, lessen their value.

THE PEDIGREE.

The ears selected in terms of the above requirements are carefully dried and numbered, with a description of each attached to the numeral. This account should include statement of length, circumference and weight of ear, number of rows, colour and shape of kernel. Prior to planting time, two kernels are removed from the middle of each ear and tested for germination. If either fail to respond the ear is discarded. This operation may be carried out with little trouble by wrapping the pairs of kernels in folded papers bearing numbers corresponding with those of the ears from which the kernels were taken. The papers containing the kernels are then moistened with water and placed in a cigar-box; the latter being tightly closed and set aside in a warm spot for five days. At the end of this period the kernels are examined, and the ears adopted or rejected according to the finding.

The breeding plot should now have been prepared as far distant as possible from the main crop, and the seed from the individual ears is sown in separate parallel and numbered rows, the numbers agreeing with those borne by the mother ears. Alternate rows are in due course detassled, all barren stalks removed, and all ears collected from the detassled rows as soon as fully matured. Those borne by plants approximating to the fixed ideal and showing the desired features in kernel and cob, are set aside in sacks numbered in the same way as the row. The combined weight of all ears from any given row is then ascertained, and the number of stalks and spacing being known, it is a simple matter to calculate the yield per acre. The rows giving the greatest yield, and at the same time not being deficient in other respects, are called the champion rows, and the ears chosen at the first selection from these rows are submitted to a second careful selection, and the best set aside for planting the breeding plot of the following season. The balance of good seed from the champion rows is planted in multiplication plots of from one to five acres, and the yield of these plots, which is carefully recorded, constitutes the performance record of the strain. The best ears are saved from the multiplication crop for the main crop of the following season. There are then seen the small breeding plot where the character of each plant may be closely observed and where careful selection is made; the multiplication plot where the new strain is tested for prepotency and productiveness; and the general crop, all the plants of which are children of plants in the multiplication plot of the previous season, and grandchildren of the same mother-ear.

The following typical performance records from the pedigree book of Messrs. Funk Bros., of Illinois, will serve to demonstrate how the history of a new strain is written. In this case selection has been made through Strain No. 140 of a grain rich in protein, with a consequent increase in feeding value; and through strains Nos. 119 and 205 for oil, corn oil being a commercial commodity of high value and employed in the manufacture of smokeless powder:—

PERFORMANCE RECORDS OF STRAINS.

Ordinary Corn contains about 10.12 % protein and 4.30 % oil.

The yields of 1904 are in nearly all cases lower than in 1903. This is due to the season, the general yield this year (1904) being considerably lower than in 1903 in this locality.

FUNKS YELLOW DENT.**Strain No. 140.—Protein.**

1902	1903	1904
	<div> <div> Ear No. 237..... yield 131 bu. </div> <div> Ear No. 210..... yield 97 bu. </div> <div> Ear No. 125..... yield 145 bu. </div> </div>	<div> <div> Ear No. 388, yield 100 bu. Ear No. 309, yield 117 bu. </div> <div> Ear No. 307, yield 117 bu. Ear No. 370, yield 125 bu. Ear No. 316, yield 115 bu. Ear No. 380, yield 121 bu. </div> <div> Ear No. 392, yield 139 bu. Ear No. 387, yield 110 bu. Ear No. 326, yield 119 bu. Ear No. 314, yield 123 bu. Ear No. 310, yield 117 bu. Ear No. 322, yield 123 bu. Ear No. 330, yield 115 bu. Ear No. 318, yield 122 bu. Ear No. 328, yield 120 bu. Ear No. 333, yield 113 bu. </div> </div>
Ear No. 140..... yield 111 bu. Av. protein, 12 %	<div> <div> 12 34 % </div> <div> Average protein.....12 34 % </div> </div>	<div> <div> 13 40 % </div> <div> Average protein.....13 40 % </div> </div>

This strain yielded 108 bu. in 1904 and the seed from this strain averages 11.87 % in protein.

Strain No. 119.—Oil.

1902	1903	1904
Ear No. 119..... yield 145 bu.	Ear No. 221..... yield 133 bu.	<div> <div> 5 75 % </div> <div> Ear No. 322, yield 101 bu. Ear No. 328, yield 118 bu. Ear No. 336, yield 119 bu. Ear No. 331, yield 116 bu. Ear No. 342, yield 110 bu. </div> </div>
		<div> <div> Average oil.....5 75 % </div> </div>

This strain yielded 103 bu. in 1904 and the seed from this strain averages 5.16 % in oil.

Strain No. 205.—Oil.

1903	1904
<div> <div> 5 13 % </div> <div> Average oil.....5 13 % Average protein.....11 53 % </div> </div>	<div> <div> 5 64 % </div> <div> Ear No. 376, yield 119 bu. Ear No. 351, yield 132 bu. Ear No. 323, yield 126 bu. Ear No. 304, yield 121 bu. Ear No. 314, yield 114 bu. Ear No. 320, yield 121 bu. Ear No. 307, yield 114 bu. Ear No. 326, yield 121 bu. Ear No. 317, yield 117 bu. Ear No. 340, yield 116 bu. Ear No. 337, yield 115 bu. Ear No. 378, yield 114 bu. Ear No. 339, yield 115 bu. </div> </div>
Ear No. 205..... yield 122 bu.	

This strain averaged 118 bushels in yield in 1904, and the seed from this strain averages 5.20 % in oil.

MAIZE JUDGING AT SHOWS.

Standards have been fixed by various associations interested in the matter for judging exhibits of maize ears. These are based on characteristics which are connected with a tendency to productiveness and the largest yield of the best quality of grain. The following is the official score card of the Illinois Maize Breeders' Association. It will be seen that there is a maximum and minimum length of ear which only permit of variation of an inch. This is for the purpose of securing uniformity in the exhibit, and any excess or deficiency in the length of the ears is therefore discounted. The maximum and minimum circumference differ by only half an inch. An ear of both maximum length and circumference would be regarded as perfectly proportioned. One with minimum length and maximum circumference would be regarded as out of proportion. With the organisation of a local maize breeders' association, it will be possible to prepare on similar lines scales of points adapted to the features of local varieties and strains.*

SCORE CARD.

	Length.	Circumference.	Per Cent. gram.
Reid's Yellow Dent	10-11	7½-7¾	88
Leaming	10-11	7½-7¾	88
White Superior	10-11	7½-7¾	88
Boone County White	10-11	7½-8	88
Riley's Favourite	9-10	7-7½	90
Golden Eagle	9-10	7½-7¾	90
Silver Mine	9-10	7-7½	90
1. Trueness to Type			10
2. Uniformity of Exhibit			5
3. Shape			10
4. Colour			10
5. Seed Condition			10
6. Tips			5
7. Butts			5
8. Kernal Uniformity			5
9. Kernal Shape			5
10. Length			10
11. Circumference			5
12. Space Rows			5
13. Space at Cob			5
14. Proportion of Grain to Cob			10

100

In all exhibits held prior to November 15th of each year, all standards of length and circumference shall be increased one-half inch and standards of per cent. shall be reduced two.

* Farmers interested in this matter are requested to communicate with the writer.

Exhibitors may remove two kernels side by side from the same row at the middle of the ear for kernel examination.

RULES FOR JUDGING.

1. The deficiency and excess in length of all ears not conforming to the standard for the variety, shall be added together, and for every inch thus obtained, a cut of one point shall be made. In determining the length, measure from the extreme tip to the extreme butt.

2. The deficiency and excess in circumference of all ears not conforming to the standard of the variety, shall be added together, and for every one inch thus obtained, a cut of one point shall be made. Measure the circumference of one-third the distance from the butt to the tip of the ear.

3. In determining the proportion of corn to cob, weigh each alternate ear in the exhibit. Shell and weigh the cobs, and subtract from weight of ears, giving weight of corn. Divide the weight of corn by the total weight of ears, to get the per cent. of corn. For each per cent. short of the standard for the variety, a one point cut shall be made.

4. In judging colour, a red cob in white corn or a white cob in yellow corn shall be cut 10 points. For one mixed kernel, a cut of one-fifth point shall be made; for two, two-fifth points; for three, three-fifth points. for four, four-fifth points; for five or more, one point cut shall be made. Kernels missing from the ear shall be counted as mixed at the discretion of the judge. Difference in shade or colour of grain or cob shall be scored according to variety characteristics.

1. Trueness to type—conforming to variety characteristics in variety classes, and to the prevailing type, in general classes.

2. Uniformity of exhibit—uniform in shape, length and circumference.

3. Shape—ear cylindrical and with proper proportion of length and circumference.

4. Colour—free from mixture and true to variety colour.

5. Seed Condition—ripe, sound, dry, and of strong vitality.

6. Tips—oval shape and regularly filled out with large dented kernels.

7. Butts—kernels rounded over the end of cob in regular manner, leaving a deep depression when shank is removed.

8. Kernel Uniformity—kernels from the same ear and from the several ears uniform in size and shape.

9. Kernel Shape—kernels deep, wedge shape, full at germ end.

10. Length—varies with the variety measure.

11. Circumference—varies with the variety measure.

12. Space between rows—furrow between rows and space caused by round corners of kernel.

13. Space at cob—space in row between kernels at cob.

14. Proportion.

(To be continued.)

Horses and Transport-Riding.

INTERVIEW WITH COLONEL DUNCAN MCKENZIE, C.B.,
C.M.G., V.D.

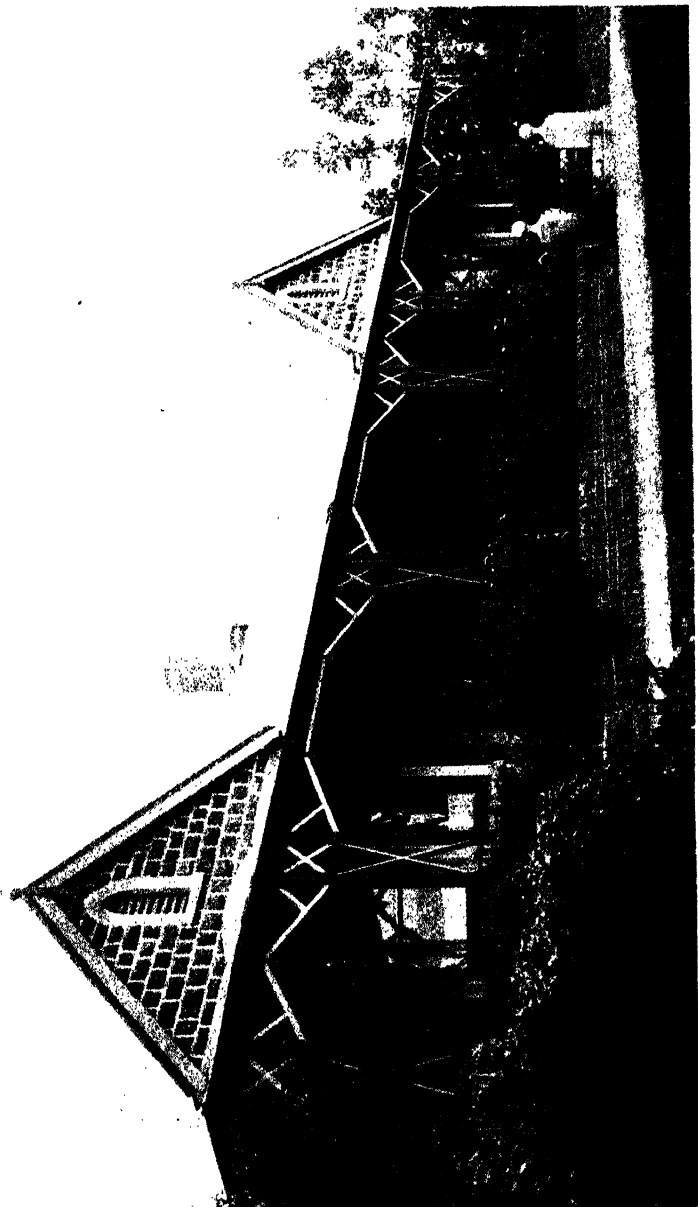
By ERGATES.

COLONEL MCKENZIE, as a distinguished soldier, is known to every colonist and to many others, far and wide, but as a stock-breeder and agriculturist he is only well known in his immediate neighbourhood. It is from this, the farming aspect, that the following is written:—

Meeting the Colonel for the first time a few months ago, I asked him if some day he would let me "interview" him. He laughingly consented. Having other engagements, I put off asking for an appointment until, in the beginning of last month, I saw by the papers he was about to assume the duties of Commandant to the Militia Force of the Colony. There was therefore no time to lose. I asked for an appointment, and, knowing how occupied his time must be, I made my visit a short one. Dr. Johnson, in disparaging the country, said that all fields were alike. In a similar sense it may be said all thriving farms are alike, but to anyone who is observant there is always something fresh or different in the management of every farm. The time necessary for looking for salient features at Cotswold I did not permit myself, and therefore what follows will be found chiefly of general or summary character.

COTSWOLD.

Colonel McKenzie is a son of the late Mr. Duncan McKenzie, who came out in the "Unicorn" in 1850, and settled on the farm Leeuwbosch. From Leeuwbosch, Cotswold is but five or six miles, the fine forest of the paternal farm constituting a striking feature of the landscape. About 25 years ago Colonel McKenzie began farming on his own account, and fourteen years ago he bought the farm on which he resides—Cotswold. Like all the high-veld of this district, it is best suited for stock-running in the summer. As regards vlei-land, the farm has proportionately a large share, and over 500 acres of this comparatively rich land have been brought under cultivation. Of underground drains only (chiefly of stone), not less than 100 miles have been put in—a pretty costly business, as all will know. The crops, Japanese millet, mealies, roots, etc., are fed to the stock kept on the farm through the winter. The coldness of the climate is against *Paspalum dilatatum*, but so far, as an experiment with a couple of acres goes to show, Colonel McKenzie is favourably impressed with it as a serviceable fodder.



NATAL HOMESTEADS.
"G. Cotswold," Colonel Duncan McKenzie, C.B., C.M.G., V.D.

ENSILAGE.

He is a great believer in ensilage, and always makes a large quantity of it in stacks, to which the stock are given free access. He has noticed that horses, if allowed to eat from stacks as much as they like, will keep in a condition as fit as if they had been stabled on ensilage and hay at nights.

RYE GRASS.

Italian rye grass he regarded with much favour, having noticed how well it does on the farm of his neighbour, Mr. A. K. Murray. The following is reproduced from my "interview" with that gentleman.

"'I have,' said Mr. Murray, 'about thirty acres of Italian rye grass—Sutton's Giant Evergreen. All the soil on the farm is poor, and this field is probably the poorest patch on the farm, and yet, as you see, it is doing splendidly. There are three cwt. of fertiliser to the acre—a mixture of superphosphate and two of bone meal. Mr. J. Moor and Mr. Richards, of Mooi River, assure me that one acre will carry ten sheep through the winter. From what I can learn, it will be good for a couple of years; quite as long as, I think, any of the so-called permanent grasses will last in this country—or at any rate in this district. I was recommended to sow 40lbs. of seed to the acre, but I have planted only twenty pounds, and, as you see, it is ample. For the sowing I used a Brenton manure distributor, a most excellent machine, which I got from the agent, Mr. John Moon. The machine is not intended for sowing, but I find that for this purpose it acts first rate for grass seed and oats. Going over the field one way I could only get ten pounds per acre on, so I went over it again from side to side. The planting was in the middle of February. During the winter it keeps perfectly green. I shall then turn my stock into it, and next summer it will be cut for hay—before seeding, of course—and then I shall expect another fine winter crop.'"

CATTLE.

The cattle are Devons; that is to say for several years the bulls have been imported Devons. The cows in milk are mostly running on a rented farm half way to the railway station, the milk going to the Mooi River Creamery. In winter the main lot of the cows go down to a farm Colonel McKenzie has at Boston; a little rough fodder is given them in winter. There is also a small herd of pure bred Devons.

HORSES.

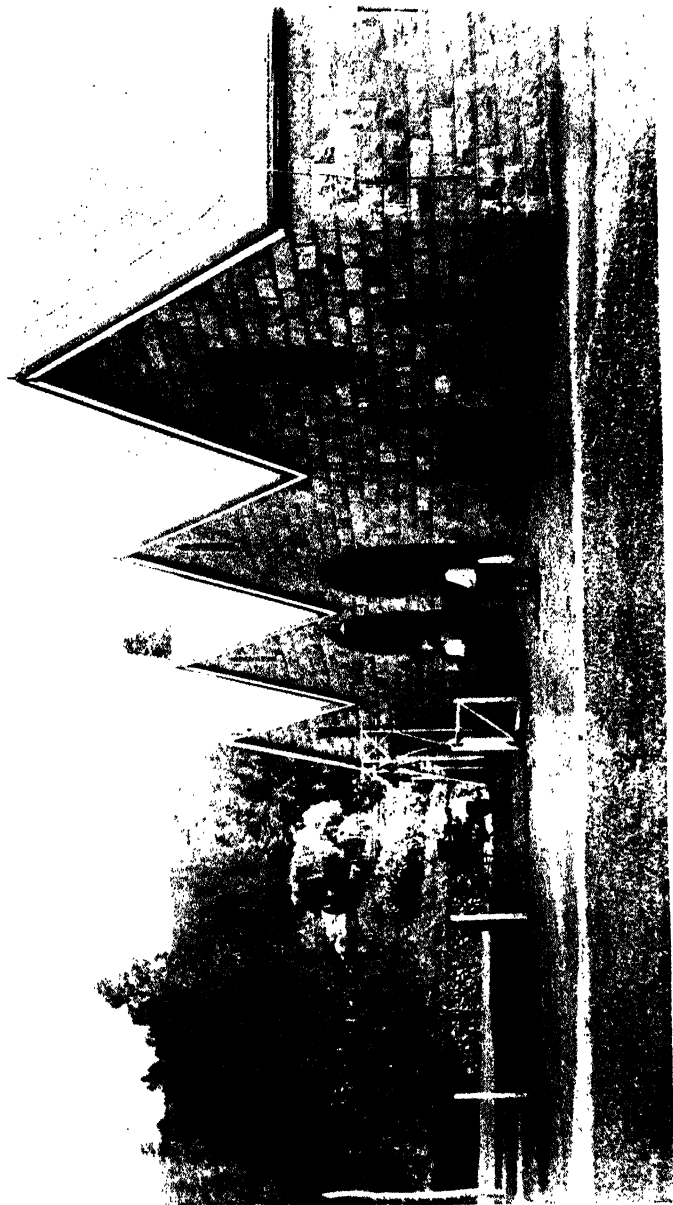
Horses have always had a great attraction for Colonel McKenzie, and he has been a breeder of them since he started farming. He began with Glastonbury, and then had King Henry, Chevalier, Agulhas, and St. Mark, and now has Royal Footman, Andrea Ferrara, Bassoon, whose sire was St. Frusquin, a Derby winner, Rugby Blagden a Shire, and Young Antrim an American trotter. I happened by chance to witness a promising looking colt of Royal Footman being broken in. I had never seen a

youngster more naturally quiet. Within a quarter of an hour from catching, the breaker had handled him all over without any tying up of legs and had mounted and ridden him bareback. When he himself broke in his horses, Colonel McKenzie always worked on the Rarey system, and in its excellence he is as firm a believer as ever. In this system he instructed a young Griqua, who for several years broke in all the Cots-wold horses. I think I may say here, without indiscretion, that for many years I have heard people of the district speak of the Colonel's fine horsemanship, of the circus tricks he taught his mounts, and of his different feats, among others that of standing on his saddle while cantering along a road. I asked the Colonel for particulars about his youthful equestrianism, but to speak on anything of such nature he was immovably averse. In the winter the greater number of the mares are sent down to the Boston farm.

TRANSPORT-RIDING.

The chief industry of Natal has always been that of carrying, or, in the military language of the Colony, transport-riding. Formerly it was done by individuals, with oxen for motive power, for their own particular profit; now it is done by the community for the public weal with steam. The latter system, with its pulling of levers and working of valves, appears to the average man prosaic, but about the wagon and its team of oxen there must always be a fascination. To a poet, such as Lindsay Gordon, the oxen-hauled wain would have afforded a subject of striking and varied interest. The really capable transport-rider was a man of infinite resource although he himself might often be unconscious of the fact. Different problems might face him every day, the crossing of difficult and dangerous rivers, repairs of breakages when distant from wagonmakers, sickness among his cattle, capsizes, digging out of bogs, desertion of drivers and all other causes of worry and strenuous work. Again, there would be spells when everything ran smoothly; he would have nothing more to do than a passenger on a mail steamer, and happily without the boredom arising from monotony. Where the early pioneer would take his wagon, "the ship of the desert," appears wonderful to succeeding generations, but it must be remembered that these men were never in a hurry and that the loads were ridiculously light and the spans ridiculously long. The business wagon-driver, on the other hand, took loads fourteen or fifteen times as heavy with a shortened span; no badness of road could baulk him, and he was always in a hurry to get to his destination. Men of this class are getting rare, and on this account, in response to my request, Colonel McKenzie consented to my giving the following glimpses at his life as a transport rider:—

"Almost immediately after leaving school—I am a Hiltonian of the Rev. Mr. Newnham's time"—he said in the course of our conversation, "I began bullock driving. My first work was at my father's bush. Then



"COTSWOLD,"
Fig. Stables Accommodation for 70 Horses

I went on to the road, working regularly between the Colony and the Transvaal and the Free State. I was always a quick goer, and in consequence could generally get a little better than the average top rates. From Estcourt to Bloemfontein and back I once went within three weeks; a record I think. Among my awkward loads was a boiler for, I think, the Henry Nourse Mine; it weighed 15,000 pounds. I loaded at Lady-smith, the general rate at that time being 5s., but the rate offered for the boiler was 20s. On my road up I was a good deal chaffed by my friends, who all predicted disaster at the Riet Spruit, beyond Heidelberg, if not earlier. The drift and its entrance were all right, but the approach for about 100 yards was very bad, and a wagon loaded as mine was would have sunk down over the axles. On inspection I found that I could reach the bank by a circuitous route. This I did, and went along it till the wagon just passed the drift. I had to do this, as there was no room to turn into it. I then hitched my oxen on behind, and pulled the wagon back, "krinking" the front wheels until the disselboom faced the drift. The rest was easy. On the opening of the fields at Barberton I worked on that road. The road, as you know, was a bad one. It was so bad that I got specially strong wagons—3½-inch spokes, and all the rest in proportion. By using this strong class of wagon—most of them made by Merryweather, of Maritzburg—I could put on heavy loads and I was saved from loss of time through break-downs and expenses for repairs. I travelled quickly, and at places like the Red Hill, often blocked for hours and sometimes for days, I struck out new roads for myself.

"In the winter I worked on the Delagoa Bay road. On this road when the time for the summer rains approached very big rates would be offered to those who would venture for last loads before trekking became impossible. I was nearly caught. By high rates and the promise of only having to load up undamageable goods, I was induced to undertake the venture of the last loads of the season from Movene. As it turned out, I was not promptly loaded up and much of the stuff was perishable. I caught up coming back a transport-rider, Mr. Rorke, then of Pretoria. Heavy rains fell. Mr. Rorke strongly advised one road and I said I would follow. At the Drift across the Crocodile he was stuck, the water being about 200 yards across and in parts five or six feet deep. I got over three spans of loose oxen, and then with a light rope sufficient length of trek-wire from different wagons was dragged across. The near end was hitched to the disselbooms, and on the far end, beyond the water, the oxen hauled. On that day in the working of this long trek-touw I waded and partly swam backwards and forwards twenty-four times.

When Barberton began to collapse I made up my mind to give up transport-riding and return to what had the greatest of all attractions for me—farming. I then bought this farm and built the house. But an event led to my going on to the road again. In 1894 my brother

John was drowned in crossing Eland's River. I went up and took on the wagons. As soon as I got into Rhodesia I found that the demand for transport was good. On this occasion I had a lot of trouble with some of the drivers—the younger hands. At Salisbury one who had deserted I found enlisted in the police. Another one I also found, and, on his refusing to return to his work, I gave him a little cuffing, but nothing to really hurt. A civilian interfered and to him I talked straightly. Very promptly I was summoned for assaulting the boy. I was defended by a Cape lawyer, who got me off on what he pointed out was a technicality. He urged me to clear off with my wagons, because he was sure the police would have me up again. I said I would not hurry away but would meet any accusation. He was right. I was had up again on practically the same charge and fined £10. The civilian to whom I had spoken straightly turned out to be a policeman in plain clothes. Altogether I was kept about a fortnight, and in that time, by loss of transport work and by loss of oxen from lions through bad herding, etc., I was the loser of several hundred pounds. At Christmas I left for a holiday spell in Natal. It was then that I heard of rinderpest having entered Rhodesia. I immediately telegraphed to the white men I had left in charge of the wagons to put the oxen on the top of a particular high mountain. Not an ox was lost from the disease, but after a short time the Government commandeered them, giving me, however, a fair price. On my journey back to Rhodesia, *via* Beira, for the purpose of settling up all the business I met a Mr. Papenfus, a Cape colonist. He had nine spans of salted oxen, survivors from rinderpest, and he offered them to me for £9,000. I accepted. The worst part of the deal was that I had to take over only a moderately profitable contract which would take about eight weeks to work off. Rinderpest and the native rebellion had sent up rates enormously. I telegraphed to my brother Peter asking him to bring me by sea *via* Beira six spans. Only half of them reached Chimoia, the then rail-head, the others for the larger part having been drowned in the landing or smothered in the lighters. To get official difficulties as regards the entering of these cattle into Rhodesia smoothed away. I saw Mr. Rhodes. He offered to "go halves"; at the moment I thought he meant in the speculation, but later on I came to the conclusion that he meant only as regards possible loss in the importation. He was desperately anxious about transport. I explained, however, that I wanted his help only as regards the clearing from my path of unnecessary formalities. This he willingly promised and fulfilled. By shortening the spans of the Papenfus lot and with a few other odd salted ones I had, I managed to span in five wagons. Within a fortnight those five wagons had earned £5,000 in bringing stuff to Salisbury from Chimoia at £5 per 100lbs. This, in transport profits, I think is a record. I went quickly for I had calculated upon the Natal animals picking up rinderpest and dying off within a very short time. As a

matter of fact, and one for which I can think of no explanation, the most of them were alive when I sold out twelve months afterwards."

BOW YOKES.

With reference to bow-yokes—which have been much advocated in the *Journal*—Colonel McKenzie said that he greatly approved of them if they were made reasonably light. The first ones in the Colony—brought from America—he considered altogether too cumbersome and heavy. For transport-riders having to cross unbridged rivers, and who at any moment might have to release their oxen to save them from drowning, bow-yokes were, of course, unsuitable.

THE ILLUSTRATIONS.

The house is built of whin-stone and sand-stone. The sand-stone comes from a quarry high up a mountain side some eight miles distant. I was much struck with a sledge or stone-boat I saw. The runners were of old railway metals. They were slightly curved up in front and from them the pulling was done. The sledge is thirteen years old and looked in perfect condition, although it has had much work and rough usage.

The stables, which are exceptionally lofty and airy, will accommodate 70 horses. The house, stables, lofts, etc., are lit throughout with electricity. The electric plant was installed thirteen years ago, and, besides providing light, it gives motive power for shelling, grinding, sawing, etc.

Ticks and Sulphur.

THE following, which is taken from *The Times*, London, will be found of interest by those who believe in feeding sulphur against ticks. The italics are ours:—

In certain parts of the British Isles, and notably in the Border districts, hill sheep are much infested by ticks, which are commonly credited with being the primary cause of the fatal disease of sheep known as "loup-ill." The ingenuity of flockmasters has been taxed to the utmost to devise an effective system of preventive or remedial treatment, and, as it had been claimed that sulphur taken internally by sheep had been found serviceable in the tropics, it was resolved to give the system a trial in this country. Special difficulties, however, present themselves in connection with hill sheep. Such stock get no food from the trough, and consequently this means of introducing sulphur, or any similar substance, into the digestive system is not available. Then, again, the sheep are scattered thinly over a wide area of ground, so that the chance of their finding, much less of licking, a briquette of salt and sulphur, is but small. When the system was tried on a farm on the North Tyne it was found that the effects of the sulphur administered in that way could not be tested, for the simple reason that the sheep would not eat it. In order, however, to ascertain whether sheep in close confinement would take a satisfactory amount of the "lick" into their system, 70 sheep, which were placed under the direction of Prof. Somerville, of Cam-

bridge, in the sheep-house at the demonstration farm, of the Northumberland County Council on October 20th, 1898, were allowed free access to McDougall's sulphur briquettes, with the result that at the end of 12 weeks the total weight of "lick" voluntarily consumed amounted to 10-6lb. This quantity, though not large, is considerable, for it means the daily consumption by each animal of about one-thirtieth of an ounce of the "lick."

As the sheep so far made use of were not affected by ticks, no information had yet been obtained in regard to the effect of sulphur upon these parasites. It occurred to Dr. Somerville, however, that although hill sheep would not lick the briquettes they might be induced to consume a sufficient quantity of sulphur, if this substance were mixed with oats, on which the sheep could be partially fed. Hill farmers but rarely give their sheep "trough food," holding that such treatment is opposed to good management, but for the purposes of the experiment it was believed that a farmer of tick-infested ground could be found who would allow a portion of his stock to be subjected to the treatment indicated. The practical application of the prevention of tick-attack by means of sulphur was first taken up to the north by Mr. E. G. Wheler, commissioner to his Grace the Duke of Northumberland. The Northumberland estates comprised many farms in the valley of the North Tyne, which are much affected by ticks and louping ill, and Mr. Wheler made arrangements with Mr. Dagg, the tenant of Gowanburn, near Plashetts, for a sufficient number of his Cheviot ewes to be placed under treatment. After consultation with Mr. Clement Stephenson, the veterinarian, it was resolved to allow each sheep one drachm of flowers of sulphur per day, which was to be mixed with just sufficient oats to induce the sheep to eat it. Twenty sheep were separated from the flock and placed in a large field, and 5lb. of oats were given to these daily. In the course of a few days the sheep ate the oats freely, and when this stage had been reached the grain was damped daily and mixed with 20 drachms of sulphur. The daily allowance of oats and sulphur was thus $\frac{1}{2}$ lb. and one drachm respectively, and both were greedily eaten by the sheep, not a trace, beyond a slight yellow discolouration, being left in the trough. The experimental feeding with sulphur began on March 17th and continued to May 18th, during which time each sheep consumed 62 drachms of sulphur without the health of any of the animals being in any way impaired.

As regards the effect of sulphur on the ticks it may be said to have been absolutely non-existent. The sheep were very carefully inspected on April 4th and April 18th, and again at the end of the experiment, and on each occasion ticks were found in abundance on all the animals. Besides the 20 sheep getting sulphur, 20 had been dipped with one of the standard compounds in general use in the district, while other 20 were left entirely untreated. In no case was any difference in the number of ticks to be observed, so that the experiment has furnished purely negative results. Such result, however, are not less useful in their way than those of a positive character, and the publication of the details of this interesting investigation will appeal in particular to sheep-farmers in tick-infested districts who might otherwise be inclined to give credence to the stories of the eradication of ticks by sulphur, such as have reached us from other parts of the world.

The Victories of Dry Farming.

IN *Life*, a Melbourne journal, T. K. Dow writes:—Twenty years are as a day in the history of agriculture, but in that short period a revolution has taken place. The system of "dry-farming" has been discovered, with the result that accepted theories as to the scope of agricultural production and the distribution of population on the surface of the globe will have to be changed. The principles of agriculture have not changed, but its methods have been not only modified, but even reversed in attaining its object under varying conditions of soil and climate. "Dry-farming" is the extreme point reached by this progressive movement of applying the fundamental principles of scientific agriculture to the needs of natural conditions.

HISTORY OF SOIL-MANAGEMENT.

The theory that in a new country land most suitable for agriculture is first occupied, then the less suitable, and so on, is much modified in practice, and in America the dry plains of the San Joaquin Valley in California were settled upon long before the wave of agricultural occupation had reached the banks of the Missouri. The discovery of Californian gold attracted population, and quickly led to agricultural development. There is a humid climate in the northern half of California, but as the State extends southward the rainfall gradually diminishes to the minimum of desert conditions. As farming spread southward, methods of soil-treatment suitable for a not excessive rainfall were discovered, and with a further advance toward the desert, means of making the most of an apparently insufficient quantity of moisture were devised. This interesting agricultural development, which originated with practical farmers, attracted the attention of a scientist who was not hampered by conventional ideas. He promoted the movement by carrying out experiments tending to demonstrate that farmers and fruit-growers would be rewarded by making still further departures from orthodox methods. This scientist was Professor Hilgard, of the agricultural college connected with the Berkley University of California, and his valuable work is the foundation upon which the present-day system of "dry-farming" is based. He drew attention to the surprising fertility of many of the soils under arid and semi-arid climates, and explained the reason of that fertility.

Some of the most valuable constituents of plant-food, he pointed out, notably nitrate, are in humid climates being continuously washed out of the soil, while in dry climates these accumulate, and in the accumulation of ages accounts for the soil's extraordinary fertility. Soil formation has taken place in conditions which, carried a little further, have formed the deposits of Chilian nitrate of soda. The agricultural process of conserving soil-moisture in dry climates was also scientifically explained, and the Californian farmers and fruitgrowers have been practising for many years all the methods of dry-farming that are applicable to the natural conditions of that State. It was following the example of the Californians, up to a certain point, that Australian farmers have

been able to carry out successful grain-growing in what are called the "dry" farming sections of South Australia, Victoria, New South Wales, and Queensland.

TRIUMPHS OF MODERN METHODS.

The comparatively limited area of arid country in California, and the attention directed towards reclaiming that area by means of irrigation, confined the modern system of soil-management within moderate limits, but on the other side of the Rocky Mountains there was greater need for making full use of moisture-conserving methods of agriculture. Guided by Californian experience, however, scientific soil-management was tried on the fringes of the "Great American Desert," and success leading to further experiments, the system of dry-farming at length became established as a practical means of reclaiming the abandoned settlements; and it now promises to carry agricultural occupation for hundreds of miles into the heart of the continent's arid territory.

The marvellous results which are being obtained by the adoption of the new methods, and the magnitude of the territory which they seem to open up for possible settlement, are giving the system a prominence and a national importance which the earlier Californian discovery failed to secure. A territory embracing no less than one-third of the United States is materially affected by the possibilities of the new system of soil management, and that is a guarantee of its value being well tested in every direction. The agriculture of Australia has gained much from a partial adoption of Californian methods, and it stands to gain incalculably more from the still further system of dry-farming by which America has commenced to develop the vast arid portions of its territory.

THE FORWARD STEP.

The first application of dry-farming principles was to manage the soil in such a way as to enable a light, but payable crop to be grown, under a rainfall insufficient for producing profitable results by ordinary agricultural methods. In this way, bare fallowing, with the summer cultivation of the fallow, produces a reliable light yield of wheat; and by a more careful working of the fallow, a slightly better crop of wheat, as well as the growing of barley and oats, becomes available. The Californians discovered this system as well as its application to the growing of green crops, sugar-beets, and other roots, as well as to the various branches of fruit-growing. What some of the dry farmers of Nebraska, Colorado, and other dry States east of the Rockies have done is to secure heavy crops, instead of light ones, where by ordinary methods no crops at all could be obtained. They have produced in scores of instances at different points scattered over many arid States, higher yields than the average of States enjoying what is considered sufficient rainfall. The claim, put forward by practical farmers, backed up by the testimony of scientific experts, is, that a rainfall of twelve inches is not merely a famine allowance to enable a crop to survive and yield a small return, but quite sufficient to enable a healthy crop to make a return equal to the average of humid climates. This is a very big step in advance, and the claim is sufficiently striking to surprise even those practical men who are familiar with the good results of the partial application of the system. Reflection, however, will show that there is nothing unreasonable in the

statements which are made in regard to the results of a complete system of soil-management.

The system as practised in Australia is one which aims at conserving soil-moisture—an ordinary ploughing in winter, and the breaking-down of the furrows in spring or summer, so increase the quantity of moisture available for the crops, that a yield of from four to eight bushels per acre more than by the old method can be relied upon. If that is the result of conserving some of the soil-moisture, or checking evaporation to a certain extent, it follows that still better results would accrue from more complete methods of counteracting evaporation and conserving moisture. Securing a full return, or a heavy crop, is merely a matter of making more complete the system of saving the rainfall for the use of the growing plants. It will be seen upon examination that the system is one in which everything is done that can contribute to conserving in the soil the moisture supplied by the rain.

PRINCIPLES OF THE SYSTEM.

An interesting article in the *Century*, written by John L. Cowan, deals comprehensively with the results of dry-farming, which he calls "The hope of the West"; and he describes the operations of Mr. H. W. Campbell, of Lincoln, Nebraska, whom he referred to as "the pioneer dry-farmer of arid America"—after whom the system is named. This writer says that in scores of places the Campbell system of dry-farming has been tried in the "dry belt," and it has been entirely successful in giving results equal to those secured by the old methods in the more humid States: "It differs in detail from the 'good farming' methods practised and taught at the various agricultural experiment stations; but the underlying principles are the same. These principles are two in number. First, to keep the surface of the land under cultivation loose and finely pulverised. This forms a coil-mulch that permits the rains and melting snows to percolate through to the compacted soil beneath; and that at the same time prevents the moisture stored in the ground from being brought to the surface by capillary attraction, to be absorbed by the hot, dry air. The second is to keep the subsoil finely pulverised and firmly compacted, increasing its water-holding capacity and its capillary attraction, and placing it in the best possible physical condition for the germination of seed and the development of plant roots. The 'dry-farmer' thus stores water not in dams and artificial reservoirs, but right where it can be reached by the roots of growing crops."

The same point is brought out by Professor Campbell, who says: "The point gained by the ploughing at a sufficient depth to stir the soil, which will later contain the major part of the feeding roots, is that of increasing the water-holding capacity. Water is not held in the soil in cavities or spaces, but in the form of films or coverings around each diminutive soil particle, consequently the greater number of small particles of soil we have, the greater the amount of water held. We can illustrate by a cube, 1 in. square; this contains six square inches of surface. Cut this cube into eight squares, one-half inch square, and we have twelve square inches of surface. Now, cutting each half-inch cube into eight one-fourth-inch squares, we have twenty-four square inches of surface, thereby increasing the water-holding capacity 400 per cent. The tendency of all soil that is left for one or more years with-

out being ploughed or pulverised is to form into larger soil-grains. By the little particles adhering to each other, cemented or attached by the salts magnesias, and alkalies that are dissolved by the water as it percolates down and then moves upward, holding these properties in solution, and as the moisture passes off by evaporation, these salts and alkalies fill the little spaces, and the smaller particles form larger soil-grains, and decrease its capacity to hold water."

STARTLING RESULTS.

The yields obtained by the thorough carrying out of methods of water-conservation in the soil are marvellous. The writer already quoted says: "It has been thoroughly demonstrated that rational dry-farming methods will produce from three to five times the results of ordinary farming methods on the same lands. In Kansas, the ordinary farmer on the plains sows forty quarts of wheat to the acre, and threshes anywhere from nothing at all up to twenty bushels. The farmers who follow the Campbell system sow only twelve quarts to the acre, and never fail to harvest from thirty-five to fifty-six bushels.

"Twenty years ago, Mr. J. P. Pomeroy, now of Colorado Springs, acquired 30,000 acres of land in Graham County, Western Kansas, and founded Hill City almost in the centre of the track. For fourteen years portions of this land were cultivated by old-fashioned methods. In all that time only one good crop was harvested, that being in a season when the rainfall was abnormally large. He had heard of Mr. Campbell and his system of dry-farming, and sent for him, telling him to go ahead and show just what he could do on land on which profitable farming by ordinary methods had been proved to be impossible. Mr. Campbell laid out a model farm on the very land that had been tried often with discouraging results. Last season the sixth successive crop was harvested. In the fourteen years in which old-fashioned methods were followed, thirteen failures were scored. In the six years in which the Campbell system has been on trial on the same lands, a crop failure has been unknown. The smallest yield of wheat per acre in that time has been thirty-five bushels, while farmers close by have never obtained more than thirteen bushels per acre, and very rarely even that. A six-year-old orchard is in prime condition, the trees being as large as eight-year-old trees in the famous fruit-growing district of Palisades. A more complete vindication of all the claims made by advocates of the practicability of farming on the plains without irrigation could not well be imagined."

DETAILS OF THE PROCESS.

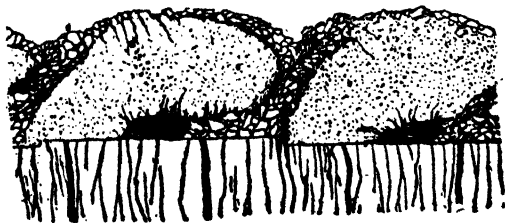
The soil is ploughed or worked at least seven inches deep, and the depth of the working is an essential part of the system. The subsoil is packed by special implement in order to compress it sufficiently to give it the necessary power of holding moisture, and to increase its capacity for the operation of capillary attraction. This packing of the subsoil is obviously not necessary where subsoils are naturally retentive, and there are few parts of Australia where it would be necessary. Subsoils, however, cannot hold moisture if the moisture cannot get into them; and, consequently, Australian farmers, in adopting shallow working, are depriving themselves of the most important feature of the new sys-

tem. The preparatory process is carried out a full year before sowing, in order to allow of a supply of moisture being gathered. Every shower that falls is captured by surface cultivation, which checks evaporation, keeping the surface covered by a layer of soil or "soil-mulch."

"After planting, the dry-farmer does not trust to luck and Providence to do the rest, and blame it all on the weather if the final result is a failure; but he continues to harrow over the ground after each rainfall until the growing crop is too far advanced to permit of this without causing its destruction." Thereafter in the case of grain crops evaporation is limited by the shade and shelter provided by the growing plants. In the case of drilled fodder, root crops, and fruit trees, surface-cultivation is continued after every shower throughout the period of their growth. It is important to observe that whenever a crop is harvested, the land is immediately reploughed, and it is kept covered by the "soil-mulch" throughout the hot autumn months. These details show how small a portion of the dry-farming system has yet been adopted by even the most advanced farmers in the semi-arid districts of the Australian States. The results of that small portion, however, are sufficient to indicate the great possibilities likely to follow the carrying out of the remainder.

Professor Campbell has issued a "Manual," in which he explains the method in practical detail. Three illustrations are reproduced, which clearly show the principles involved. Illustration No. 1 shows the soil as the plough leaves it, and is described in the "Manual" as follows:—

"This cut shows the common condition of ordinary ploughed fields. Observe the appearance underneath the portion of the furrow that has



THE CONDITION OF THE SOIL AFTER ORDINARY PLOUGHING.

been thrown over by the mould-board on the side of the next furrow. This cut shows a field that had not been disked before ploughing. Here is the stubble, weeds, and clods that have rolled from the next furrow, while right at the point where the furrow is tipped over, the soil is firm from the bottom up. The usual manner of further preparing this ground is by the use of the harrow. This has a tendency to level, and, if shallow ploughed, to work the ground down fairly well at the bottom of the ploughing.

"In deep ploughing of six or more inches the harrow has but little effect upon these cavities underneath. This is a very serious proposition, and it is the source of many bad conditions which have a direct effect upon the final yield of the crops. First of all, it cuts off the seed or root-bed from the subsoil, preventing the movement of any moisture

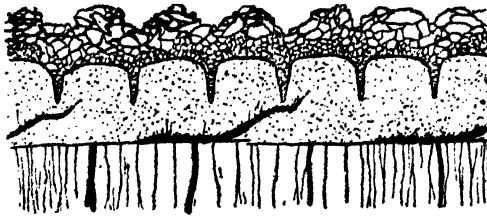
from the subsoil up into the root-bed. It also forms air-spaces or cavities where a volume of air may exist, which aids in drying out the soil immediately adjacent. It also prevents the lateral roots and feeders from extending and permeating this portion of the soil, leaving a large per cent. of our surface soil in a condition not at all beneficial to the growing crop."

THE EFFECT OF THE "PACKER."

In No. 2 is seen a cross-section of the same furrow, after it has been worked by the subsequent packer.

"Here the cavities and loose condition of the soil at the bottom of the furrow have all been obliterated by the use of the sub-surface packer.

These sharp, wedge-shaped wheels have both a downward and lateral pressure against the soil in the spaces between them. The soil is moved by the packer in such a manner as to form a firm and evenly-packed stratum at the lower end of the furrow.



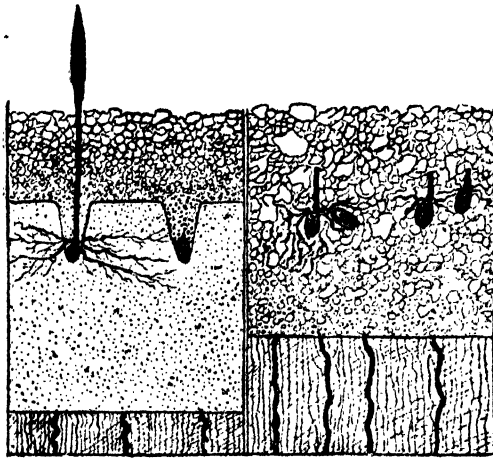
THE SOIL AFTER THE PACKER HAS BEEN USED.

"A word about the disc. Had this land been double-disked before ploughing, the stubble, weeds, or manure shown in a strip at the bottom would have been scattered through the lower part of the furrow, the soil made finer, and the packer would have made it firmer, increasing its water holding capacity. This would have promoted more general nutrification, facilitated greater and more uniform root growth, and made it possible to have even doubled the yield of the crop, for it is not uncommon that just a little more available moisture will carry the crop to a good rain that will be ample to finish a fine crop, otherwise the crop loss might have been 50 per cent. or more. This is especially true of all small grain. After the packer has been used, by employing the ordinary smoothing harrow, or the so-called Acme harrow, the surface is pulverised and made fine, and the lower part of the upper portion, which is shown as loose and coarse in the cut, is made firm, forming a perfect seed bed. The lower part made firm by the packer, illustrated in the cut, forms the main root bed."

THE DIFFERENCE BETWEEN THE TWO METHODS.

Illustration No. 3 shows the difference in packed and unpacked ground on the young plant, and of this Mr. Campbell says:

"In cut No. 3 we have two conditions of soil. On the right we have the more common plan; here we find the grain of wheat in somewhat coarse and loose soil. It is in this kind of seed bed that the wheat frequently remains all the autumn without germination; again, it may sprout because of the moisture of a light shower, only to wither and die



THIS SHOWS THE DIFFERENCE BETWEEN PACKED AND UN-
PACKED GROUND.

from later dry, windy weather, or, perchance, may absorb just moisture enough to burst the shell, and send the germ out slightly and a few feeble rootlets, then be completely ruined by the winter freezing, because of a lack of moisture in the soil about the roots to draw the frost in thawing out.

"On the left we have the ideal condition, a condition that can easily be attained at a nominal expense. By the use of the sub-surface packer, when the soil is in proper condition, as previously explained, we get that fine, even, firm condition, as shown, to a depth of 7 in.; then, with the Acme harrow, we secure the fine, loose mulch, about 2 in. deep. With the closed heel shoe drill we secured that V-shaped opening, about 1 in., in the firm soil, into which the grain drops. As it reaches the bottom it is surrounded, except over the top, with fine, firm, moist soil. The fine dirt that very naturally fills this opening as the shoe moves along puts out wheat in the ideal condition.

"The numerous small moist particles of soil that come in contact with the wheat convey the moisture quickly and in ample quantities. This, coupled with the air from above, brings about the very remarkable germination and development shown at the extreme left, in the short space of five days."

One pound of butter fat will make about one and one-sixth pounds of butter. During the process of butter making, the slight loss of fat in the skim-milk and butter-milk is more than compensated for by the added water, caseine, and salt in the butter. The additional butter made from a pound of butter fat is called the overrun—that is, the extent to which the churn overruns the test. The amount of overrunning depends upon the completeness of skimming, thoroughness of churning, and the way in which the butter is handled. A butter maker can readily determine the amount of overrun by dividing the total number of pounds of butter produced for a given time by the number of pounds of fat in the milk delivered to the creamery during that period.—*Journal of Agriculture, W.A.*

Gardening Notes for March.

By W. J. BELL, Nurseryman, Florist and Seedsman, Maritzburg.

KITCHEN GARDEN.

THE main crop of vegetable seeds should now be sown for winter, such as Beet, Cabbage, Borecole or Kale, Brussels Sprouts, Carrot, Kohl Rabi, Lettuce, Mustard and Cress, Onion, Parsnip, Parsley, Radish, Salsafy, Spinach, Savoy, Eschalot and Turnip.

Beet.—The soil best suited to the culture of the Beet is that which is rather light than otherwise, always provided that it is thoroughly enriched by manure. The seed should be sown about 2 inches deep, in rows (drills) about 1 foot apart. When the plants have attained three or four leaves, thin out so that they may stand 5 or 6 inches apart. There is nothing in the way of greens so good as these young "Beets," and the thinnings of the beds can be used as needed from the time the young plants are 2 or 3 inches in length until they are large enough for ordinary use.

Cabbage.—The Cabbage requires a deep rich soil, and thorough working. If these requirements are met, and good varieties planted, there is no difficulty in obtaining fine solid heads. Large varieties plant about 3 feet apart, and small early sorts about 18 inches.

The best early varieties are Jersey Wakefield, Early York and Cocoa Nut.

Medium.—Cape Sugar Loaf, Heartwell Marrow, Enfield Market, and the various kinds of Drumhead for late crop.

Borecole or Kale.—Sow in February or March and transplant in March and April—the dwarf varieties 18 inches and the tall 2 feet apart. They are more hardy than Cabbage, and are improved by a touch of frost.

Brussels Sprouts.—This is one of the best vegetables for winter use, producing from the axils of the leaves an abundance of Sprouts resembling small Cabbages, of excellent mild flavour.

Carrot.—The Carrot should always be furnished with a good deep rich soil, and as free from stones and lumps as possible; and if a rather light loam it is better than if compact and heavy. It is waste of time and labour to try to grow root crops of any kind on a poor and unprepared soil. For succession seed may be sown from August up to March; at the latter date the early varieties should only be used. As Carrot seed is slow to germinate, all precautions must be taken. Sow in rows about 12 inches apart, and if the ground is dry tread the seed well in when covered, and afterwards lightly rake the surface. Before sowing mix the seed up with light and sandy soil, by this means the seed will be more equally distributed.

Such well known varieties as Early Short Horn, Stump-rooted Nantes, James' Intermediate, Ox Heart and Long Red Altringham do well here.

Endive.—When blanched this is one of the best salads for winter use. For cultivation, see Lettuce.

Kohl Rabi.—A vegetable intermediate between the Cabbage and the Turnip. The stem of this singular vegetable swells into a bulb something like a Turnip, above this are the leaves somewhat resembling a Cabbage. They are served like Turnips, and are very delicate and tender when young, possessing the flavour of both Turnip and Cabbage to some extent. In Europe they are extensively grown for stock, and are thought to keep better than the Turnip, and impart no unpleasant taste to milk. One advantage claimed for the Kohl Rabi is that it suffers less from severe drought than the Turnip, and therefore a crop is almost certain. This being so, it must be well adapted to many parts of South Africa. It is best cultivated by sowing the seeds in rows of 18 inches apart, thinning out 9 or 12 inches between the plants. When the weather is favourable the thinnings may be planted at the distance above named.

Lettuce—Lettuce is divided into two classes—the Cabbage, with the round head and broad spreading leaves; and the Cos, with long head and upright narrow leaves. The Cabbage varieties are most tender, and the Cos the most crisp and refreshing. The latter variety is much improved by blanching. Sow the seed thinly in a carefully prepared and slightly raised border, and shade with light litter until the young plants are above the ground. Lettuce delights in abundance of water during the whole period of its growth. Thin out the plants from 9 to 18 inches apart according to variety.

Mustard and Cress.—Mustard and Cress is used as a salad with Lettuce and other salad plants. Sow in shallow drills, and cut when a few inches in height. It grows very rapidly, and for salad should be sown in small quantities and at frequent intervals.

Onion Culture.—For ordinary garden culture, and to produce large bulbs, sow in rich well-prepared soil in the months of March or April; transplanting during the following July and August into drills two feet apart and ten inches in the drill. The young plants should be carefully raised from the beds, so that the fibrous roots may not be injured. The rows where the young Onions are to be planted should have the soil raised in small ridges about three or four inches above the rest of the bed. After the plants have taken firm hold of the ground the ridges should be drawn away from the plants, so as to leave the whole of the bulb exposed to the air—nothing but the fibrous roots left underground. This rule is very generally neglected, the consequence being thick-necked and imperfect bad-keeping bulbs.

For Field Culture.—The best time of the year to sow for the main

crop of Onions in the colder parts of the Colony is during July and August. In the coastal districts, however, and in the warmer parts of the Colony, it will be advisable to sow the seed in May, June, or July, according to situation, so that the crop will have a chance to mature before the hot weather sets in. The seed may be sown either broadcast or in drills. The soil can hardly be too rich, and should be well worked and made solid and compact before and after sowing by the roller. The chief point to be observed in sowing is to cover the seed as lightly as possible. Indeed, when the soil is in really good condition for seeding it is best to give no other covering than pressing it in by the roller, the seed being sown quite on the surface. This is necessary to secure the proper position of the bulbs above ground. When the land is likely to be weedy, drilling or sowing in rows should always be practised; and it is a good plan to drop grains of barley along the line, at a foot or so apart, so that the rows may easily be distinguished and loss of plants prevented in using either hand or horse hoe. The barley is, of course, removed as soon as the rows can be distinguished. Our climate is well adapted for the growth of this—one of the most nutritious, wholesome, and universally esteemed of all culinary vegetables in cultivation. Sow the seed in drills 15 inches apart; 4 lbs. per acre is sufficient, but if sown by the hand in an open drill, 8 lbs. of seed is required; and when grown for pickling purposes 15 lbs. of seed to the acre should be sown in drills, and 20 lbs. per acre broadcast.

The best and leading varieties are Brown Globe, heavy cropper, one of the most useful varieties; Danver's Yellow, large, early, mild, thin brownish-yellow skin; Giant Rocca, splendid large globular variety, brown skin, delicate flavour; James Keeping, strong flavour and good keeper; White Spanish, pale straw colour, mild, one of the best for general cultivation; Red Italian, popular variety, large and flattish, very hardy and good keeper; White Lisbon, hardy and early, mild flavour; The Queen, for pickling, small silvery white variety; Silverskin, small, extra early, finest for pickling.

Parsnip.—Parsnips succeed best in deep free rich soil, and, as the application of fresh manure tends to the production of forked and badly-shaped roots, ground in high condition (having been heavily manured for the previous crop) should be selected. If manure must be applied, let it be well decomposed, or use guano. The ground should be trenched 2 feet deep, and ridged up as long as possible before sowing. Best method of sowing is in drills of 15 to 18 inches apart as soon as the ground is in fair working condition, scattering the seed thinly, and covering them half-an-inch to one inch with the finest of soil. Then tread down the soil over the rows with the foot, and afterwards rake over lightly to tidy the border. When the plants are 2 or 3 inches high thin them out, leaving 5 or 6 inches between each. Keep the ground free from weeds, and the surface open by frequent deep stirrings with the hoe.

Radish.—This well-known salad may be sown for succession from August until April. Radishes are often sown much too thickly, and this causes the roots to be small, hard, stringy, and disagreeably hot in flavour. Sow broadcast in beds of convenient size, and cover the beds evenly and lightly with fine soil. The great point is to get the plants to grow rapidly after the seed appears above the ground; this may be accelerated by top dressings of soot or wood ashes, and watering morning and evening during hot dry weather. The leading varieties are French Breakfast, olive-shaped; Long Scarlet; Round Red and White, mixed; Black Spanish, large and hardy, for winter use; Rose China, for autumn sowing.

Salsafy.—The Salsafy or Oyster Plant succeeds best in light well-enriched mellow soil, which, previous to sowing the seeds, should be stirred to a depth of 18 inches. Sow in drills 18 inches apart, cover the seeds with fine soil an inch and a half in depth, thin out to 6 inches apart. This is a delicious vegetable and may be used in various ways. In a young state it may be eaten in the same way as Radishes; also the young shoots may be blanched and used as Sea Kale. When grown to a full size it is generally boiled or stewed like Parsnips or Carrots. Cut into small pieces it makes a fine soup like that from Oysters.

Spinach.—Sow in small quantities at intervals of three or four weeks, from August to April. It may be well to add that it is best developed and more tender and succulent when grown in rich soil. As Spinach often fails to germinate in hot weather, care should be taken immediately after sowing to firmly tread or roll the soil over the seed, as by this means the moisture is preserved in the soil about the seeds to a much greater extent than if the soil was left loose.

For winter crop sow the prickly seeded variety.

Turnips.—Turnips thrive well in almost any garden soil, but deep rich soil is the most preferable, and is indeed essential to procure bulbs of a mild and delicate flavour. Some time previous to sowing, the ground should be deeply dug and heavily manured. The seed should be sown in narrow drills, from 12 to 18 inches apart. Scatter thinly and evenly, and cover over with the lightest of soil. Thin out the plants as soon as sufficiently strong to draw, so that they may stand from 6 to 9 inches apart in the row. If fly makes its appearance, and this is very troublesome during the summer, dust the plants over with quicklime early in the morning while the leaves are moist with dew; repeat this operation as often as may be necessary. Keep the surface of the ground open and free from weeds by frequent stirrings of the hoe.

FLOWER GARDEN.

The months of March and April is the best season for sowing all kinds of hardy Annuals, Biennials and Perennials.

Some varieties, such as Daisy, Carnation, Cowslip, Forget-me-not,

Hollyhock, Pansy, Pentstemon, Primrose, Polyanthus, Pyrethrum, Verbena and Wallflower will succeed best when sown in boxes. They must have free drainage, and should be placed perfectly level on bricks to raise them a little from the ground, and a well-sheltered position should be selected for them, open to the morning sun only. If natural shelter is not available, something of an artificial kind must be provided, and in any case temporary shade must be provided by covering with litter until the seedlings are through. This is particularly necessary with such seeds as Primrose, which take long to germinate and require care for several months.

Continue planting evergreen fruit trees and flowering shrubs, also fence plants, while weather is favourable.

An Agricultural Credit System for Cape Colony.

THE Government of the Cape Colony has caused enquiry to be made into the possibility of establishing an agricultural credit system there. A full statement on the subject has been issued by the Cape Treasurer and is being widely circulated. Correspondence and suggestions are invited by the Cape Treasurer. The pamphlet is issued for the purpose also of placing legislators in possession of facts regarding what is being done in other Colonies, so as to assist them when legislation is brought forward during the session.

The pamphlet commences by showing what is being done in the States of the Australian Commonwealth and New Zealand. It has been ascertained that the security demanded in all cases is a first mortgage, or the equivalent of a first mortgage, and that in none of these States has it been thought safe to depart from that principle.

In brief, the suggestions made in the pamphlet are:—

That is will be to the advantage of Cape Colony to adopt the principle of giving loans to individual farmers and co-operative associations of farmers upon such terms as shall stimulate agricultural and pastoral industry.

2. That the loans should be granted for the following purposes:—

(a) To pay off existing liabilities in cases where the Board approves of the proposed improvements.

(b) To effect improvements.

including:—(1) Water storing and leading.

(2) Fencing.

(3) Clearing land for agriculture.

(4) Planting of orchards and vineyards.

(5) Farm buildings.

(c) Purchase of stock and plant.

3. That the security in each case shall be a first mortgage upon the land, or in the case of leasehold property, such security as the Board shall think fit. In each case the Board shall make an independent valuation of the land, and the advance shall in no case exceed two-thirds of the total value of the land, with the improvements, etc., for which the advance is sought. The Board to have absolute power to accept or refuse any application.

4. That loans should not be granted for a sum less than £50, nor for a larger sum than £5,000, without the special consent of both Houses of Parliament. The object being to encourage the working farmer of small means rather than the larger landowner, and to stimulate the closer settlement of the land.

5. That the interest charged shall be 5 per cent., or if paid within fourteen days of the due date, to be $4\frac{1}{2}$ per cent., a rate that should cover the actual interest to be paid as well as the working office expenses. In addition to the interest, the borrower should pay the actual cost of the loan, expenses of valuation, etc. Beyond this there should be no charge for preparing the bonds, beyond the cost of registration, unless special legal expenses have to be incurred. The mortgage bonds, also, should be free from stamp duty.

6. That the terms of repayment should vary with the nature of the loan; but in no case should they be extended beyond 40 years.

7. That in the first place the amount authorised to be raised should not exceed one million sterling.

8. With regard to the management and control, it is suggested that the soundest method is that of creating an Agricultural State Bank, controlled by a Board nominated by the Government, with the approval of Parliament, and governed by regulations which have received Parliamentary sanction. If a system of agricultural loans were directly under the control of Government, it would be almost impossible to dissociate it from political influence, and certainly it would be hampered in its work by the suggestion of political influence. The Board, when appointed, should have full statutory powers to accept or refuse any proposal without interference from the Government of the day, and the members of the Board should, after appointment, only be removed from office by a direct vote of both Houses of Parliament. The Board, too, should take control of all loans and advances made in this Colony under various Acts of Parliament, and from the date of its appointment all loans should be under the terms of the Act.

The regulations should give the Board power to insist, where necessary, upon the insurance of live stock, and the insurance against fire of farm buildings, etc., also the power to take possession of land or property should the borrower be in arrears with the payment of sinking fund or interest. The Board further should have powers of inspection and the right to insist upon the proper maintenance of all property upon which advances have been made, and in case of failure on the part of the borrower, the Board to have the right to execute repairs at his expense.

The Board should have authority to issue mortgage bonds bearing interest at a rate of not exceeding 4 per cent., and to an amount not exceeding one million sterling. Such bonds to be secured by the State and to have such currency as the Government may think fit.

The following persons should be disqualified from serving on the

Board: Members of either Houses of Legislature, directors, managers, or officials of any Bank, Company, or Association dealing with the lending of money, and no advance may be made to any member of the Board, nor upon any property, in which a member of the Board is directly or indirectly interested.

Annual statements should be issued by the Board showing:—

- (a) Transactions of the Board for the preceding year.
- (b) The total amount of loans issued.
Purposes for which they were issued.
The total amount repaid.
The total amount outstanding.
The instalments and interest overdue and unpaid.
The number of advances and average amount of each advance.
The number of applications received for the year.
The valuation of the loans outstanding.
- (c) A balance-sheet, together with a profit and loss account, for the year.
Together with such other information as the Government may direct.

[To those who are conversant with the various systems of agricultural credit, it will be evident that the proposal of the Cape is practically to start a Government *Land Bank*. It does not appear to be suggested that the credit system should be extended to banks worked on the Raiffeisen principle.

The removing of agricultural credit from direct Government control and thus dissociating it altogether from political influence, is a most essential and important condition.—E.T.M.]

Ranch Life in Wyoming, U.S.A.

MR. H. C. TREW, of Clifton Hills Station, South Australia, has forwarded us the following letter from an old friend, Mr. Harry Chapman, who, after many years' experience on cattle stations in the north of South Australia, has for some years been ranching in Wyoming:—

Mr. Chapman writes, under date of 28th November, 1905:—"I have just returned from making our last shipment of 'beef' for the season. We shipped about 1,500 head of steers. They weighed between 1,200 and 1,300 lb. All fat stock as well as stores are sold by weight. All stock, excepting horses, are sold by live weight. We are now having a big snowstorm, the first to amount to anything for the season. These snows remain in the mountains all winter, and make water for irrigation during the summer. I would never live in a dry country again under any consideration. There is a stream within 20ft. of our kitchen door, with beautiful trout in it. In the winter months

sheep and horses will live in snow without water, but to do well cattle must have water, though they will exist in snow. During the winter months all the game comes down to the open country. It was very plentiful when I first came here, but has since been gradually exterminated. It is no picnic running stock in this country. We have our drawbacks, mostly condensed into one word, 'Trusts,' just as you have in Australia.

"The only improvement which I would recommend to your own method of roping cattle is a different saddle. The first thing you or any other Australian would say about our saddles is that they are much too heavy. Putting, however, all prejudice aside, the Wyoming cowboy saddle is the best in the world for both man and beast. The saddle in which I ride myself weights 40lbs.! I can rope a 1,600-lb. bull and hold him. This saddle cost \$65, or, say, £13, and will last for years. The great feature in these saddles is that they never hurt a horse's back. Among the hundred head of saddle horses which I here employ you would have hard work to find even one that has ever had the least sign of a sore back. But in Australia the reverse is, and ever was, the case. Again, you can ride a horse further in these saddles than in your light ones, the weight being more evenly distributed. To show my opinion of these saddles, if I were returning to Australia and going into the cow business there again, no man should ride for me who did not use these saddles.

"These men here are similar to your stockmen—good and bad. Take them as a rule, they are not as good judges of stock as the average stockman of Australia. An owner of cattle here is called a stockman or cowman; the boys that ride are called cowboys or cowpunchers. Do not suppose that these fellows are rough and uncouth; far from it. As far as education goes, they are not college boys, but they are good practical fellows. They get \$10 a month, or £8, so that you see their wages are good, though, of course, their work is rough in winter. Your ideas on the subject of the cowboy sitting down to a frugal meal of pork and beans are somewhat astray. They are the best fed labouring men on earth. There is hardly anything which you can mention that they do not get to eat. Canned food of all sorts, both vegetables and fruits; everything in the country that is canned, and that says much in a land where, according to Indian notions, a gramophone represents canned man.

"When we start on the round-up or muster, the cook drives a four-horse wagon with the tucker, beds, cooking and sleeping tents, stove, etc. The horse 'wrangler' drives all the loose horses. The cook, wagon, and spare horses go direct to the camp. The rest make their drive, should they be gathering to brand. If there is a corral stock-yard handy, they cut out the cows and calves, take them to the corral, rope the calves by the hind feet and pull them to the fire. Two boys and a man handle them. The calf being dragged by his hind feet is on his side. The calf wrestler never lets him up. You will find this mode a great deal easier than roping out in the open. We always rope in the open when there is no corral, but even then the boys wrestle the calves down without leg ropes. In roping outside a long rope is used, one about 40ft. in length; in a corral one that is less than 20ft. answers the purpose. In a corral the rope is tied hard and fast to the horn of the saddle. You have your calf going straight away from you. Drop your loop just in front of the

hind leg; a good roper gets both feet every time. We never rope outside when we can get a corral. When there is no timber we build wire corrals. We often brand with only two men. One ropes by the hind feet and the other holds the calf down by the head. The roped dismounts, and the horse is taught to hold back. That gives this man a chance to brand, etc. Then, should he want to throw a full-grown steer, and there are two men, one ropes by the head or front feet, and the other by the hind feet, and stretches the animal out. At roping competitions the steer is given 100 feet start. The boy runs up, ropes the steer by the neck or horns, throws the slack of the rope over the steer's back, and lets it come under the belly; then turns his horse sharp at an angle, and throws the steer as hard as possible. The horse keeps on pulling, and the boy jumps off and ties the steer's four feet together—hog-tie—a short rope of some 10ft., carried for the purpose. It often happens that when the boy goes to tie the steer the horse slacks up, and the steer rises. Then the boy has to get back to his horse as quickly as possible. I have a big chestnut sorrel horse which is very expert. He never slacks up, but just keeps pulling; in fact, when the steer is tied he does not care to be led by the bridle to slack up to get the rope off.

"It is no easier to get along here than in Australia. I do not advise anybody to come here from Australia. There are as many chances there as here. This is, however, one good thing in this country. If you have anything for sale, you can always get it away to market—railroads everywhere. As for shipping cattle—what you call trucking—these fellows can beat Australia easily. We load 1,000 five-year-old steers, weighing 1,300lbs. apiece, twenty-five head to the car, in an hour. We unload the lot in ten minutes. They simply all walk out of the cars at the same time on to one platform. But the Australian system of loading and unloading sheep is far ahead of anything here.

"I am going back east into the farming country to buy a couple of cars of bulls; they will be Herefords, pedigreed stock. We use no other kind. We run horses as well as cattle, having about a hundred brood mares, and two fine stallions, one a trotter and the other a hackney, weighing 1,200lbs. apiece. In quoting horses we speak of weight, not height. Stallions, pedigree bulls, and fancy stock not sold by weight are always quoted age and weight. All of the stores, which we raise ourselves, are dehorned for the benefit of likely buyers to top them up on corn. We ship a steer of 1,000lbs. The buyer feeds him on corn for six months till he weighs 1,300 or 1,400 lbs. We sell him for four cents per lb. off grass; they sell him for 6 cents per lb. off corn. We—that is, my partner, Miller, and myself—own 1,400 acres of irrigated land, from which we cut hay, etc. We can grow all kinds of vegetables here, lucerne, oats, barley, and small grain, but not maize. We keep up thirty horses in the winter, some on hay alone; others that work hard on hay and oats. Our stallions are never turned out. The mares are brought into the corral stockyard every day. We have a herd of pedigree, or blooded, cows, and raise our own bulls. I used 120 bulls on the range last summer. The bulls are taken out of the herd except during three months of the breeding season, and all of our calves are weaned now—a thousand head—and they will be fed on hay until 1st April, 1906. They get no more hay until sold, when four years old. They go into market weighing about 1,300lbs. live weight."

Experiment Farms.

CEDARA.

TO DIRECTOR EXPERIMENT STATIONS.—

During the past month an average amount of work has been got through, and various crops have been planted.

The chief feature has been an effort to keep the growth of weeds in check. The season throughout has been most favourable for their growth, and, in spite of the constant use of scarifiers, weeders and hoes, they have not yet been thoroughly subdued. Rain fell on 14 days, and totalled for the month 4.20 inches. The heaviest fall was on the afternoon of the 28th, when 1½ inches fell almost within an hour. These heavy rains invariably do damage. On this date there was a heavy hail-storm in the district, which, I understand, did great damage, but luckily it did not cross the Farm.

The maximum temperature has been very normal, and was highest during the last ten days of the month. This benefited the mealie crop immensely, encouraging quite a vigorous growth. The mealie top grub has so far not been much in evidence.

Early in the month a crop of mangels was planted, and I regret to report that they have proved a failure. They were planted under favourable conditions, germinated and appeared over ground very regularly, and, as hopes were being entertained that they were likely to get over the critical period, two days of hot north winds came and withered them right off. In previous years we have had similar failures, and find that it is a very delicate crop to get safely through its early stages. It is now too late to re-sow; the ground will therefore be utilised for swedes and turnips, prior to the sowing of which it will be stirred with the Martin's Cultivator and rolled.

About 26 acres have been planted with Horse Tooth mealies for ensilage, and have made a good start.

An ordinary crop of Japanese millet is being grown for hay; it is also being grown on a manure section comprising 10 one-acre plots; further, on a section which is to be devoted to *Paspalum dilatatum*; roots of the grass have been planted with a spacing of 10 feet, and prior to planting the roots the ground was *all* sown with millet to keep the spacing from being overrun with weeds, and by the time the crop is ready for harvesting the roots (*Paspalum*) should have gained sufficient hold to maintain their position.

The recognised method of laying down *Paspalum* is by the transplanting of roots from a nursery bed. A trial, however, has been given planting seed "in situ" with a mixture of millet as a nurse crop. A piece of

ground has been prepared for the growing of salt-bush, the seed of which will be sown early in February, and it is hoped that it will show its drought-resisting powers and warrant more extensive cultivation.

The portion allotted for carrots is very rough, and it will be necessary to have it re-ploughed before the crop can be put in.

On the Catch Crop Section, lupines, carrots, pea-nuts, soy beans, buckwheat, mustard, and flax have been planted, completing the instructions of the section, with the exception of tares, rye, oats, wheat and rape, which are listed for planting during the last week of February.

A Manure Section of pea-nuts and soy beans has been planted. The seed of the latter has evidently been faulty, as the crop has come up very irregularly, while on a section of mealies, where it was planted as a catch crop and to resist wash, it has made splendid growth.

Special varieties of potatoes received during the month have been planted in the Variety Section, and small quantities of seven varieties have just been received from America, which will be planted immediately. These are: Early Northern, Early Puritan, Late Puritan, Carman, Improved Green Mountain, Sir Walter Raleigh, Uncle Sam.

A good deal of time has been given to the spraying of potatoes with Bordeaux mixture, and the section of three acres has been sprayed twice. A knapsack spray has been used.

It is to be hoped that by another season a spray-cart will be obtained, as it would be more practical for the spraying of like areas.

Cattle cabbages have been transplanted from beds, but a great many have been destroyed by grub, necessitating the re-filling of blanks.

A small quantity of *Paspalum Stoloniferum* grass seed which was received from Hawksbury Experimental Station, Australia, has been sown into a nursery bed.

In connection with the large amount of drain-cutting on hand and since my last report, another stretch of 600 yards has been cut. Special attention will be given now to further cutting in order that certain ground allotted by you for barley and wheat experiments may be available.

The carpenter and blacksmith are having their time fully occupied. The erection of poultry runs and houses, the adding of a verandah to the Forester's house, and painting of iron buildings, doors and windows of main farm buildings are in hand, also the installation of permanent water connections off the main and overhauling water fittings in the dairy.

The working stock are healthy, and the Persian sheep recently purchased have been inoculated for blue tongue. On the 29th of the month they were again weighed, the result being a general decrease, due to the effects of the inoculation.

I am sorry to say that one of the field assistants has been sick and unfit for work during the month.

The loss of a trained hand from the field at this juncture, when so many experimental crops are in process of planting, all requiring special attention, is a serious matter, and check to the work. I hope, however, that a favourable report on this officer's condition may be submitted next month.

ALEXANDER REID,
—
Farm Manager.

THE COLLEGE.

During the past month the School has entered into the second year of its existence, and may now be said to have passed through its initial stages, and to be gradually taking its place as one of the fixed Educational Institutions of the Colony. The new session commenced on January 16th. Five new students have arrived, bringing our numbers up to 18, while three more are entered to come at Easter. Several new and interesting courses of lectures have been started this session. You yourself have started two series, one on the Principles of Agriculture, embracing Cultivation, Drainage, Irrigation and Fencing, and one on Stock Management. Staple Cereals will also receive detailed attention during the term. The Analyst has instituted a course on the Chemistry and Physiology of Plant Life, while the Veterinary, Surveying and other series are still going on. The students are showing a decided increase of interest in these lectures, and it may be confidently predicted that, as they get older and have farms of their own, the lessons learnt here on farming on scientific lines will be put into practice by them, and prove of incalculable benefit both to themselves and to the Colony at large. In the field and shops the work proceeds on the same lines as last session, though, in addition to the work done before, the students are now sent to the Forester for a fortnight at a time to receive instruction in the sowing and planting of trees, as this is likely to be such an important branch of farming in the Colony during the next few years. The health and conduct of the students has been quite satisfactory. The horses lent to the Farm by the Remount Department have been very useful to us, as the Farm Manager has been able to lend them from time to time to the students to proceed to their work when this is situated at a distance from the College. We have thus been able to afford practice in riding to many of them who would not otherwise have been able to keep a horse during the time they were here. We have now got a cricket XI. together, and have arranged to play three or four matches before the end of the season. So far, we have not been very successful, though a decided improvement is already noticeable in the team. The butter-making competitions, held at the end of each month among the boys employed on that section of the farm by the Assistant Dairy Expert, have proved a great success, and do much to encourage

keenness in the work. The proposed ploughing competitions, which will take place as soon as all boys have had an opportunity of doing this work under supervision, will go far to reduce any monotony in the work which might otherwise prevail. A medal has been offered with a view to stimulate a healthy rivalry in this all-important branch of field operations.

C. W. HANNAH, M.A.,

House Master.

WINKEL SPRUIT.

TO DIRECTOR EXPERIMENT STATIONS.—

Work during the month under review was chiefly confined to planting operations, and was proceeded with in the following order:—

Cotton, principally Sea Island Extra Fine, with a few lines each of Sea Island Fine, and Toole cotton, was planted on all the spare land on the vleij adjoining the varieties of cotton planted last year.

The young plants are making rapid growth, and have already reached a height of from 6 to 10 inches.

The varieties planted last year have all been pruned hard back in order to determine the difference in yield and quality if left as a perennial or grown as an annual. The following results, tabulated from last year's crop, show at least six or seven varieties which can be profitably grown on the Coast:—

		lbs.		lbs.
Toole Cotton, U.S.A.	...	279	Lint and	517 seed per acre
Pride of Georgia	...	239	"	490 "
Peterkin	...	219	"	530 "
Rowden's Prolific, Texas	...	219	"	384 "
Truitt's Prolific, U.S.A.	...	212	"	424 "
Russells Big Boll,	"	200	"	450 "
Ashmouni, Egypt	...	179	"	265 "

Although the Sea Island Extra Fine only yielded 106 lbs. of lint and 325 lbs. seed per acre, the fineness, texture and length of staple is far superior to any of the other kinds.

Ramie.—About 500 plants were taken from the nursery and planted in the cane breaks, and most of them are looking healthy, although troubled at times by the hot north winds.

Sweet potatoes were planted in Pig Paddock No. 2. The vines have all struck, and give promise of a really fine crop. Pea-nuts will have to be re-planted (as soon as the weather is suitable) on the top of the hill, as mostly all the young plants have been cut down by the hot winds, sand and cut-worms. Cut-worms are very prevalent this year and we have killed hundreds.

Maize Section No. 3, consisting of about four acres of newly cleared bush land, has also been planted and drained off in the gully where water was lying.

Maize on Section No. 2, planted in December, is growing splendidly, also the cow-peas and Lima beans, which were planted alternately between each two rows of maize.

The Lima beans planted were the varieties sent from Cedara, and, with the exception of two kinds, all are doing well.

Chicory was the next to receive attention, about $\frac{1}{2}$ of an acre being planted on the old Arrowroot Manure Section. The seed germinated very well, but, owing to the excessive hot winds during the past ten days, most of the young plants are being destroyed.

Manure from the kraal was carted into the old Variety Sections and $1\frac{1}{2}$ acres of maize planted. This is not through the ground yet, and sadly wants a drop of rain. This section had also to be drained, as there are a great number of springs on it.

Five hundred coffee berries were planted in bamboo pots, celery in tins, and rhubarb and asparagus in seed beds.

The section formerly occupied by Gordon Pacha cotton, near the Indians' quarters, has received the eleven Inanda varieties of cane, also a case of cane imported (by Mr. Wilkinson, of Ottawa Estate) from Queensland. There were some fine sets from the Inanda varieties planted, which should develop into good croppers. The case imported by Mr. Wilkinson contained three varieties, viz., Whitcolorum, No. 22 New Guinea, and Demerara Seedling. The No. 22 New Guinea is for flooded land, and strange to say (whilst most of the other two varieties were dry and the eyes dead) this was growing in the box.

We have just finished planting 2,200 tea plants sent by Mr. Gilbert of Ifafa. These plants arrived in splendid condition and are a credit to the packer. Although they are so healthy, it is doubtful if we can save them or a great number of them unless rain falls very soon. The ground is very hot and dry on the surface and, although well watered when planted, the hot sand seems to have a serious effect on them.

The young locusts are very bad, and the destruction of them will have to receive our serious attention for some time.

We are sadly in want of rain at present for the crops just planted, and, unless we get a good shower within the next few days, a number of our sections will have to be replanted.

Labour supply is plentiful.

W. JOHANSEN, Manager.

"Among the horses belonging to His Majesty (King George III.) at the Great Lodge," says Mr. Frost in 1807, "is a small Arabian stallion called the Hampton Court Arabian. This horse is about 13 h. 3 in. high, and, notwithstanding the smallness of his size, if put to a large, roomy mare, he gets horses 16 hands high and full of bone, capable of carrying twenty stone a fox-hunting."

Correspondence.

CLEARING LAND OF WEEDS.

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

SIR,—Some time ago I noticed a letter in the *Journal* regarding the use of sunflower crop in clearing a plot of land from weeds. Last year, when growing a crop of sunflower, I remarked on the absence of weeds, which I could not account for until I read the letter in the *Journal*.

Having some land this year too weedy to be of any use, I planted with sunflower towards the end of October, with the result that, despite the wet season, there are very few weeds to be seen although the land has never been touched since sowing.—Yours, etc.,

Umtwalumi.

WEEDS.

POTATO SEED.

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

SIR,—I am forwarding you under separate cover a small basket of potatoes (as seeing is, etc.), the fifth remove from imported. The original seed was imported and planted on totally different soil 18 miles from here, and the seed from them was planted again on the same soil twice. I have since planted this seed three times (seasons) on the same plot here, and I find no deterioration; in fact, the result has been more satisfactory than the first remove, and with all the wet season they did not start to show the blight spots until shedding their bloom. Through this experiment having turned out so well, I fail to see the necessity of so much fear entertained by many of not having the imported article, when exchanging our own seed will suffice and has done in this case, though I do not advocate continually planting on the same field other than as an experiment. The crop is averaging 50 bags per acre with 800lbs. fertiliser, which for "Early Rose" is good, as they are not heavy croppers at the best of seasons (at least in this district).—Yours, etc.,

Nottingham Road.

G. A. STEVENS.

HELLEBORE REMEDY FOR TICKS.

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

SIR,—Re Hellebore for ticks, can you please inform me what proportions of Hellebore powder and fat are used in making a dressing for killing ticks?—Yours, etc.,

Camperdown.

G. J. ARCHBELL.

[Two ounces of Hellebore to one pound of fat.—Ed., *Ag. Jour.*]

WITCH-WEED AND PINEAPPLES.

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

SIR,—I shall be glad if you could tell me the best means for eradicating "witch-weed" from old kafir gardens. This parasite gets at the root of the mealie and kills it. I forget the correct name of the weed, but our variety has a small red flower, and another a pale pink flower rather larger than the red one.

What is considered the best variety of pine to grow for the English market, and where could suckers be obtained?—Yours, etc.,

Og, Unzumbi.

T. STAPLETON.

[There is only one effective plan for getting rid of witch-weed among mealies—changing the crop. Up-country, two years under forage (oat) crops will clear the land perfectly. Manuring is also desirable. The weed after a time will often return; it is indigenous and is to be found growing in the veld.

The best pineapple for export to Europe is the Smooth Cayenne. It is grown on the Coast, and suckers will be obtainable from those who cultivate the variety.—Ed., *Ag. Jour.*]

OX HARNESS.

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

SIR,—A few months ago I saw in your columns an illustrated article showing harnesses for oxen. I am sorry to say that I cannot now find that article to refer to. I am anxious to buy a simple harness which can be used by a native for one ox to pull the cultivator through the mealie fields. The mealies are now too high and strong to use two oxen with a yoke, and we have no horse which we can use. Any information or advice that you can give me on the subject which will enable me promptly to secure an ox-harness will be greatly appreciated.—Yours, etc.,

[See Short Notes.]

L. C. S.

International Exhibition at Brussels.

HIS EXCELLENCY THE GOVERNOR has been informed by the Consul for Belgium, at Johannesburg; that in 1910 an International Exhibition will be held in Brussels.

Export of Natal Fruit.

ON the 1st inst., in the Council Chamber, Durban, a meeting was held, under the auspices of the Natal Fruit Farmers' Union, for the purpose of considering the question of fruit export to London. Mr. V. Seymour (President) occupied the chair, and the attendance included the Hon. Mr. Charles Hitchins (Minister for Harbours and Railways), who made an important announcement with respect to the attitude of the Government in regard to the proposed exportation of fruit over sea.

The Chairman regretted that the attendance was so small. The question of fruit export had been forced upon them. Fifteen years ago President Kruger placed a duty of 3d. per lb. on fruits entering the Transvaal. The consequence was that the local markets were glutted. At that time the export of fruit to England was seriously taken up, and many experiments were made in that direction, and some of the experiments proved very successful. Arrangements were then made for very much larger experiments, but in the meantime the Transvaal took off the duty, and since then the question of distant export had not come seriously before them. But in the last four or five years the acreage under fruit on the coast had extended tenfold, and they now had the question of distant export to consider again. He was very happy to say that the Government had taken the matter up very seriously. The fruit they had to deal with more particularly was the citrus fruit, and they thought it better to limit the co-operative movement to that class of fruit; therefore, to-day, they desired to form a co-operative association for citrus fruit. He predicted that the export would prove successful.

Mr. Rock proposed: "That this meeting of fruit-growers recognises the time has arrived for co-operation with a view to exploiting the over-sea markets, and gratefully accepts Government's offer of assistance for the coming citrus season, which experience will form a basis for the organising of a co-operative association of a more comprehensive and complete nature."

Mr. J. E. Shire seconded.

The Hon. Mr. C. Hitchins (Minister for Harbours and Railways) said the Minister of Agriculture would have been present that afternoon, but he was now very busily engaged in the western part of the Colony in connection with East Coast Fever. Respecting the very important question for which they had met, the present Government, on taking office, made one of their standard points the development of the land, and with that purpose in view the fruit-growers on the coast were communicated with, and also the farmers up-country, and the two interests were being worked by the Government conjointly. The Government hoped to meet with a great deal of success with respect to the up-country farmers, but the Government were not quite so confident as regarded the attitude assumed by the coast growers of fruit. Those growers had not responded so readily to the overtures that were made to assist them in the export of fruit as the Government might have fairly expected. But the Government would struggle up to the last in its endeavour to send

large consignments of citrus fruits to the London markets. Personally, he should do his utmost in the direction of export, because, from the small experience he had had respecting fruit being accepted in the London markets, he felt certain that if the coast fruit-growers made the attempt for one season they would not require the assistance of the Government in the future, for the reason that the enterprise would prove so successful that they would devote the whole of their energies in the direction indicated. Proceeding, the hon. gentleman referred to the efforts made by the Cape Government in the direction of the export of fruit, and said a "fruit department" was now established. Quoting a circular issued by the Cape Government Railways, the hon. gentleman said, according to that circular, "all fruit must be selected, graded, and packed by senders in accordance with the instructions issued by the Department of Agriculture." The boxes had to be of standard size. If the export of fruit proved successful, then the Natal Government would be prepared to establish a department for the aid of fruit-growers, in the direction now carried out by the Cape. (Hear, hear.) Clause 16 of the Cape circular said: "It is understood that this proposal is being given effect to by the Government in order to encourage fruit culture, and more up-to-date methods in packing and transit; and in every district where any considerable quantity is grown, it is strongly urged that Co-operative Associations should be established, through the medium of which considerably greater efficiency and economy could be maintained." He asked that a Committee, or organisation, be formed, in order to see that the conditions which the Government wished to impose were carried out as regarded the export of fruit. The fruit must be graded, it must be properly packed, it must be sent to the London markets in the same sized cases. The Government would order the cases, they would order the packing, and they would place the services of experts at the disposal of the fruit-growers, to see that the fruit was packed properly, plucked properly, and graded properly. They considered that the time for talking had passed, and the time for action had arrived, if opportunity was to be taken of the coming season. The Government desired to know: (1) How many cases were they to order; (2) what was the size of the cases they had decided to pack their fruit in; (3) what was the nature of the packing which they were going to adopt. The Government could supply fruit-growers with boxes. As regarded the fruit when it arrived in London, arrangements would be made by the Government for the sale of the fruit, and it would be done outside the middleman there. (Hear, hear.) The matter of finance had been brought to his notice, and the Government would help in finance in every possible way. He should recommend to the Minister of Agriculture that fruit should be consigned to the Agent-General in London, and he hoped the fruit would be sold within one week after its arrival, and the Government would be prepared to have the money cabled out, payable here 24 hours after, free of any expense. He was of opinion that from the time the fruit was exported from Natal, the money should be back in the Colony, at the disposal of exporters, within five weeks. Concluding an interesting speech, the hon. gentleman said the Government would endeavour in every way to assist the enterprise. (Applause.)

The resolution was adopted.

In reply to a question, the Minister for Railways and Harbours said

the shipping companies had offered to accept 25s. per cubic ton for open freights.

The Chairman announced that the meeting had promised 102,000 naartjes, which, with the 230,000 already promised, made a total shipment of 332,000 naartjes. (After the meeting, a further quantity was promised, bringing the total up to 500,000.)

On the motion of Mr. Rock, seconded by Mr. Shire, the following gentlemen were appointed to carry out the arrangements for the shipments:—Messrs. V. Seymour, C. W. Morrison, H. Scott, H. W. James, J. E. Shire, G. H. North, and H. Howard.

Mr. Ernest D. Goble was elected secretary to the above Committee.

The Chairman moved that this meeting is of opinion that the citrus fruit shipper before the middle of May would be detrimental to the condition of fruit on arrival.—The resolution was adopted.

The Chairman strongly urged the appointment of an agent in London to dispose of the fruit who was a practical man, and did not object to hard work. (Hear, hear.)

The Hon. Mr. C. Hitchins said he would be personally responsible for the appointment. They could take it from him that the individual chosen would be a first-class business man.

Mr. M. Glensnick counselled the meeting in regard to various matters connected with the proposed shipment of fruit.

The following report was presented by the Government expert packer (Mr. Anderson) in regard to the packing of citrus fruit:—Box recommended for use is 2ft. x 1ft. x 8in. (oranges); wood for same, ends, thickness $\frac{1}{2}$ in., sides $\frac{1}{4}$ in.; cost in Durban 50s. per 100. or 6d. each. Sufficient nails, wood-wool, and labour for putting boxes together, 2d. By putting two layers end downwards of first-grade oranges, except Naval oranges, and allowing sufficient space for wood-wool between them, each box will hold 56; fruit to be cut, leaving $\frac{1}{4}$ in. stalk, when first showing sign of colour; allowed to sweat for two or three days before packing; may be wrapped in tissue paper, but it is not necessary. Timber for these boxes arrive in shocks of 25 ends and 50 sides; it is unnecessary to go to the expense some people do when sending fruit Home, providing the fruit is packed with care and is perfectly sound; these boxes will do for apples and pears. One of the principal reasons of Mr. Sim's mission to England is to investigate into the best and latest methods of packing fruit of all classes fit for England. I contend that, so far as the handling of fruit is concerned, there is no reason why it should be packed any more carefully for export than it should be to be put on the local market.

Complimentary votes of thanks concluded the proceedings.—*Mercury.*

The U.S.A. Department of Agriculture is probably the largest Agricultural Department in the world. The value placed by the American people on an up-to-date Agricultural Department may perhaps be gauged by the amount voted by Congress for its work. The appropriation for the fiscal year 1907 amounts to just upon ten million dollars, besides which, revenues from reserves, etc., bring the amount to over eleven millions. New buildings, to cost 2300,000, are being erected for the Department, while the paid staff two years ago numbered over 4,500, in addition to which there were nearly a quarter of a million special correspondents and reporters.

District Reports.

EMPANGENI, 1st February.—The past month has, so far, been the warmest this summer. It began badly, 97° in the shade being registered on New Year's Day. As may be surmised, north winds predominated. The rainfall—4.05 inches—was a fairly good one, however. The fact was omitted in report for December (1906) that two district locust officers were appointed for this Division on the 11th and 12th of that month. Losses among stock reported amounted in all to ten head of cattle and one mare. The latter succumbed to Dik-kop, contracted, it is believed, on a visit to Ongoye Mission Station. On the 29th the wife of a native game conservator was reported to have been taken by an alligator at Lower Mfolozi-Hlabisa Main Drift while drawing water from the river, and on the 30th a boy goat-herd was said to be taken by another in the Empangeni Lagoon, about seven miles in a direct line S.W. by S. of this Magistracy. All that need to be said regarding crops is that they generally continue to flourish.

A. R. R. TURNBULL, Magistrate.

HLABISA, 15th February.—This has been an abnormally wet season; rains continue to fall almost daily. Locusts are very numerous throughout the Division, and in the course of a few days will be on the wing. Natives are bitterly complaining that their crops, which promised to be exceedingly good, are being entirely destroyed by locusts. E.C.F. is gradually spreading and wiping out every beast. The natives say they are ruined, that the East Coast Fever has killed off their cattle, locusts have eaten up their crops, and it takes them all their time to get money to buy sufficient food to keep them from starvation. It will be impossible for some of them to pay their taxes. Horsesickness has been deadly this season; nine out of twelve have died; all except two belonged to officials. A horse belonging to the Clerk of the Court has just died; it was about 19 years of age, and has been in Zululand for about 13 years, at Empangeni, Ubombo and Ingwavuma for a number of years. It was generally considered to be salted, but the symptoms of sickness and death were unmistakably "horsesickness." The Government should seriously consider the advisability of supplying local officials with donkeys to avoid the enormous expense in insurance. Owing to Tick Fever all ox transport has been stopped, and great difficulty is experienced in getting transport. The natives here are quiet, law-abiding, and absolutely loyal.

A. E. HARRINGTON, Magistrate.

IMPENDHLE, 22nd January.—The only item of importance to report, and one which has exercised the minds of people more than any-

thing else, is the weather. Up till a short time ago Impendhle had escaped anything serious in the shape of visitations by Jupiter Pluvius, but that gentleman, having no doubt become conscious of derelictions in this respect, decided probably to make it up during the present month, and he has done so with a vengeance. The rainfall registered to date during January is 7.43 inches. The heaviest fall occurred on the 9th inst., when 3.8 inches were registered. The greater portion of this fell within a period of about two hours. Hail accompanied it, and everything in the form of vegetables and fruit in the village, which happened, unfortunately, to fall in the track of the storm, was destroyed. At the Residency, which is not more than 500 yards away from the village, no damage whatever was sustained. The lightning and its concomitant thunder was terrible, and those suffering from nerves had rather a bad time whilst the storm lasted. The hotel in the village was struck, but without injury, fortunately, to anyone; three head of cattle were, however, killed in the vicinity, and a gum tree was struck at the Residency. All rivulets, streams, and water courses were turned into roaring torrents and the hill-sides presented, as a consequence, sights that were most picturesque. The postcart came in just as the storm was passing away, and it had great difficulty in crossing the Situnjwana Stream. The stream passes within a few hundred yards of the village, and had the cart been a few minutes later it would inevitably have had to remain out the whole night. The country with all this rain is consequently looking its best, and stock is accordingly in the pink of condition. Crops are coming on well, but weeds, such as our mutual friends the black jack, water grass, and others, appear to think that they have as much right to exist as anything planted by human hands, and are therefore troublesome and difficult to exterminate or keep down. Several farmers have been losing sheep lately through theft. In one case there can be no doubt that natives are the culprits. Detectives have been set to work, and it is hoped their efforts will sooner or later be crowned with success. A meeting of farmers was held in the Court House on the 17th inst., and the question of whether or not the Division was to be put under quarantine against East Coast Fever was then fully discussed. Much interest appears to have been evinced, as between 30 and 40 attended. The feeling was entirely against the proposal, and a resolution which was moved to the above effect, was accordingly defeated. We therefore remain as we were. A horse died in the village a few days ago, and it is supposed that the death was due to Horseshickness. This disease has never before, I am told, been known to occur in the village, but as mosquitoes, of a large brownish semi-transparent species, are very plentiful, it is quite possible that they are the cause. Proof might be furnished by future cases, and it would perhaps be well therefore if farmers were to keep an eye on these insects.

T. B. CARBUTT, Magistrate.

NEW HANOVER, 19th February.—Heavy rains continue to fall almost daily. On the night of the 16th inst. there was a tremendous downpour, which damaged the railway line from the Railway Bridge at Sterk Spruit or Umtshwati to beyond Schroeder's Station, a distance of about six miles. The trains are still unable to run through. I regret to have to report the prevalence of Horsesickness in the Division. It is very necessary for horses not to be allowed to run either late or too early in the morning, more particularly during fine weather; on wet days it is generally believed there is no danger of horses contracting the disease. I am glad to say, as far as I know, all other kinds of stock are free from disease. The crops are looking most promising; the weather has been ideal for mealies. The wattle industry is being pursued vigorously all over the Division. I noticed while out on Branch Court duty on the 6th inst. that there is an insect known as the bag-worm or caterpillar doing a good deal of damage in some of the wattle plantations. It fairly strips the trees of leaves, the tree being literally covered with little bags hanging from the twigs. In two plantations the insect is doing serious damage. The Europeans are paying their poll-tax in freely: already the sum of £300 has been collected. There is still a balance of £150 to £200 to be collected. Only one European has asked to be exempted on the grounds that he is a pauper or possesses no property; this speaks well for a thickly populated district like this. Very few Indians have paid the poll-tax yet. The new Rule in the last *Gazette* having reference to native huts, known as "Ilawu," will exempt a great many natives this year who had to pay the poll-tax last year. As regards fruit, the peaches have been an utter failure this season, being completely destroyed by insects. Plums have been fairly good, also apples and grapes. Burrweed is in great evidence this season, and the vigilance of the road parties in its extermination on the main roads and land-owners must be unabated if the Colony is to be freed of this destructive weed. Few people know what a lot of harm the seed of the burrweed does to all kinds of stock, not only to the fleeces of sheep. Unlike the black jack weed, it does not fall out of the hair when once attached, and both horses and cattle suffer considerably from the effects of the burr. It seems a great pity that land-owners will not use more energy to grapple with this undoubted troublesome weed. If destroyed before reaching the seed stage, it could be eradicated, I believe, in a few years all over the Colony, but unfortunately it is allowed to seed, and the seed is scattered broadcast by the wind and streams all over the place.

H. W. BOAST, Magistrate.

PINETOWN, 19th February.—During the last month the fall of rain has been heavy and frequent, the rivers are all very full, and several narrow escapes from drowning have been reported. Crops are all looking well, and, judging by present appearances, mealies should be obtain-

able at low prices. The aphid has done a certain amount of damage to the amabele, especially in that portion of the district near the Umkomaas. Citrus trees are not doing so well as one would like to see, they have not the usual amount of foliage, so consequently the fruit will suffer. People are wondering when they will see the last of East Coast Fever; it is a pity that they do not pay more attention to the advice given by the Veterinary Surgeons. Some weeks back the natives' cattle which had been in the temperature camps were handed back to their owners, but had, of course, to be sent to clean veld. They are all, I hear, doing very well. I have heard of one or two cases of horsesickness lately, and last week a horse died of "blue tongue." There are parties here who profess to have a cure for horsesickness, but so far we have had no proof. Locust officers have now been appointed in this Division and are busy destroying "hoppers."

H. G. GRANT, Acting Magistrate.

PORT SHEPSTONE, 8th February.—The past month has been very old-fashioned indeed, for the weather carries my memory back to 35 years ago, and we had earthquake shocks in those days. Like the thunderstorms of those days, the earthquake shocks were little talked about. Anyone who grumbled at the weather in Lower Umzimkulu Division during January must be of peculiar temperament. Heavy rainfall has been succeeded by bright sunshine and cooling breezes; there has been just enough breeze to carry the bees along on nature's errand and enough sunshine to carry on nature's work of ripening the crops. All around one sees peace and plenty, and it would do good to the heart of Dr. Elliott to see the happy Norsemens of this district. The market has been well stocked with fruit and vegetables grown in the district, realising prices which should be payable to growers. Pineapples are sold at much the same price as in Durban, but the quality is superior; eggs and butter rule at about the same price as in Durban, although eggs should be cheaper in such a district. Cattle are "rolling fat" and free from disease. Horsesickness has appeared, but not in its usual severity. Locusts are very bad, and the staff of five Europeans and nineteen natives are hard at it in the locations. I had to veto the sale of arsenic to Indians, rather would I supply them with firearms. Aloes are being planted extensively, and in this connection I welcome Mr. C. Manning from Victoria County, who will put all his energy into the fibre industry.

J. R. CURRIE, Acting Magistrate.

STANGER, 19th February.—The season has been favourable for agriculture, the rainfall has been abnormal; the only drawback anticipated are locusts, swarms of which abound in most parts of this district. Fungus is being used for their destruction; a supply is obtainable at this office. A locust officer is or was employed in the Division. I have not heard the result of his labours. East Coast Fever has proved itself

as deadly here as elsewhere in this sub-continent. Upwards of 2,000 deaths have occurred in this district from East Coast Fever. Owners have been very hard hit. The Veterinary Department has worked night and day to combat this latest plague, but, unfortunately, the disease had three months' start, and, owing to the movement of cattle during the eventful native rebellion in these parts, the infected tick was well scattered. East Coast Fever is believed to have been brought into this Division *via* Durban by some Vryheid cattle in May last; it was not till August that Veterinary Surgeon Amos diagnosed it as such. The weekly loss from this disease is now about 300 head. I am pleased to say that we have in our midst a colonial-born Veterinary Surgeon, *i.e.*, Mr. Donaldson; old Maritzburg College boys will remember him. He took his degree in London. Mr. A. Jackson, Stanger, is successful in the growing of lucerne and *Paspalum dilatatum*, and the seed of the latter should be soaked for 24 hours before it is planted, and to ensure success it should be placed in good soil. Tea and sugar are doing splendidly. Crops are looking well; late as it is natives are still planting mealies. New mealies have been in for a couple of months in these parts. The records of this Court prove that Isitshimeyana is extensively consumed by the natives; to this cause I put down the many cases of immorality that one hears about. The presumed murderers of Mr. Oliver Veal at Chief Meseni's kraal during the rebellion are being tracked down; within three months one of the most blood-thirsty and sensational murders will be tried in our Courts. Horseshickness has carried off many horses and mules this season.

P. B. GOBLE, Assistant Magistrate.

UMLALAZI, 31st January.—The weather for the month for the time of the year has been very pleasant. At the beginning of the month rain fell almost every day; the total rainfall was 9.40 inches; maximum temperature, 99 degrees; minimum temperature, 35 degrees. I am pleased to say the Division is still free of all cattle diseases, and all stock is looking well. Young locusts are in millions, and good work is being done by the three locust officers. Also, many of the farmers have killed all on their farms, but there has been a difficulty in obtaining arsenic. I fear it will not be long before the hoppers are all on the wing, and much damage may be looked forward to. At present the crops are looking well, and the amabele blight, in consequence of the rains, is not nearly so bad this year. Two native women were bitten by black mambas and died within a few hours. The mouth of the Umlalazi River still keeps open, and, in consequence, mosquitos are not as plentiful as they might be. The health of the Division, on the whole, has been good.

C. C. FOXON, Magistrate.

UMZINTO, 2nd February.—The rainfall registered during the past month is 1.93 inches. The average temperature was: maximum, 92 degrees, and minimum, 55 degrees, the highest and lowest registered being 99 degrees and 53 degrees respectively. The month has been a hot and fairly wet one, most favourable to crops of all description, though more rain is urgently needed. Given a continuation of the prevailing favourable weather and provided the hatched and hatching hopper locusts abounding throughout the district do not get the upper hand of those engaged in their destruction, the crops—especially mealies—will be a bumper one, and likely to gladden the hearts of the populace, both white and black. The cotton-growing industry embarked upon last year on the farm Beverstow, under the guidance of the Hon. John Kirkman, M.L.A., promises to be a success. It is to be sincerely hoped that it will not be nipped in the bud at its inception in the plant's discovery by one or other of the numerous blights or parasites this country seems to abound in. Fibre might well be given a trial. The plant's very appearance conduces one to the belief that it will not be handicapped by anything belonging to our parasitic world. Horsesickness has made its appearance and several valuable animals have already succumbed. Other stock and poultry are reported to be doing well. There has been only one outbreak of East Coast Fever in this district—in August last. Thanks to the promptness of the Department and the vigorous measures taken by D.V.S. Tyler and those under him, there have been no further deaths or fresh outbreaks. Some of the farmers are already congratulating themselves that they are out of the bush, but this is not the case. The most extreme vigilance is still required, and not until all the ticks within the infected area are dead and gone will we be safe from the recurrence at any time from the already infected centre. The Veterinary Department is, as far as I can see, to be congratulated on the valuable assistance it is receiving from a divisional committee of the most representative cattle-owning farmers and residents in the district. Their labours and work has been most energetic in its nature, and culminated in a request to the Minister of Agriculture, at his meeting at Umzinto on 11th ulto., asking that the Chiefs and Headmen in the district be called together for the purpose of having the provisions of the law and regulations controlling the disease, and the duties devolving upon them, thoroughly explained to the natives. Their request was authorised and the necessary proclamation and explanations were accordingly made to the assembled Chiefs and Headmen at a meeting at Umzinto on the 23rd of January. The D.V.S. and six members of the E.C.F. Committee were present at this meeting. The natives appreciated the action taken, and expressed themselves thoroughly satisfied that the course adopted was the only one likely to save their stock. The course followed in this Division might be adopted with advantage in other districts, provided a committee can be got together, everyone of them imbued with the sense of helping them-

selves, instead of looking to the Government and Treasury only to save them and their herds. Several uninjured snakes' heads were purchased from natives and others at this office and forwarded to the Government Bacteriologist for anti-venene purposes. On the 31st January, however, an Indian brought a live mamba, 8 feet 6 inches long, caught in a torpid state when changing its skin. It will be interesting to learn whether it reached the Laboratory alive. It was despatched in an empty ammunition box with air holes provided. [The mamba arrived alive.—Ed., *Ag. Jour.*]

H. J. COLENBRANDER, Acting Magistrate.

UTRECHT, 11th February.—A tremendous quantity of rain has fallen in this district during the past month, and the rivers, such as the Buffalo, Bivane and others, have been impassable for days: Residents inform me that they have not known the rivers so full for years past. Many mealie fields along the banks of the rivers have been washed away in consequence. As the seasons have been so dry for several years past, both farmers and natives have been tempted to plough right at the edge of the rivers to get a little moisture, with above result this season. Otherwise crops are in perfect condition, and, if nothing unforeseen happens, this year ought to be a record one for mealies. A great deal more ploughing and sowing of mealies has taken place this season than in the past. I am pleased to be able to report that up to the present this district has been wonderfully clean of all stock diseases, notwithstanding the fact that East Coast Fever has been on our borders for the past three years. It is to be sincerely hoped that some of the districts may escape this terrible scourge, which is devastating other parts of the Colony. Another marvellous thing is that we are still entirely free of locusts, which are also so troublesome in some parts of the Colony. Utrecht district will probably get its turn sooner or later. Sheep are the only stock suffering from the abnormal rains, most of which are crippled in consequence of the tremendous wet. Although up to the present this district has only had two or three cases of horsesickness, I am afraid this disease may still be very bad before winter sets in, also in consequence of the great quantity of rain, which always seems to make this so much worse. Utrecht, which is noted for its fruit, has a magnificent crop this year, especially of peaches and grapes. The peach trees are so laden that the branches cannot stand the weight. There is no doubt about it that up to the present this is the finest season farmers have experienced in this district for years past.

J. S. ENTE, Magistrate.

Ramie : The Textile of the Future.

By W. J. BELL.

RAMIE fibre is derived from a plant of the natural order *Urticaceae* or Nettle family which grows to a height of four to eight feet, and in appearance, habit, and growth somewhat resembles the common Nettle, but is devoid of stinging hairs. There are two forms of this plant. One of these, the China grass plant, which has been cultivated by the Chinese from very early times is known botanically at *Urtica nivea*, and is the variety most suitable for cultivation in Natal.

The fibre of this plant is undoubtedly one of the strongest known. It is extremely durable and is less affected by moisture than any other fibre. Ramie fibre has a brilliant silky lustre, can be dyed readily, and is exceptionally long, the ultimate fibres varying from three to sixteen inches in length. Ramie will do all that cotton does and all that the other textiles do. It will grow where cotton grows, but what is more important, it can be produced where cotton cannot, and it has qualities which no other fibre possesses, as it does not rot, giving it for many purposes, such as fishing lines, nets, sail cloths, ropes, boot and saddlery thread, tarpaulins, rick cloths, tents, hose, shop blinds, boot linings and other requirements necessitating exposure to damp, great advantages. It is non-elastic, and here in it is invaluable for machinery belting and ropes, measuring tapes, and, mixed with wool, it imparts non-shrinking possibilities to that article.

The fibre is also invaluable for many other purposes where rigidity is an advantage. It is suitable for taking the place of wool, cotton, flax, hemp, jute, and even silk, and is not surpassed by any of these articles; in some cases it is proved more successful. It makes splendid cloth for uniforms and almost indestructible table linen, sheeting, dress goods, velvets, curtains, lace tapestry and upholstery, lamp wicks, waistcoatings, trouserings, riding-breeches, etc. It is an ideal hygienic clothing, invaluable for underwear, and is pronounced by the medical profession as the most advantageous surgical dressing. Its duration and toughness alone commend it as a material that is invaluable. As clothing for troops where durability plays so important a part, it is an ideal material, inasmuch as Ramie cloth will outwear several cotton ones. A tunic made from Ramie which was worn by a trooper in the South African campaign outwore three cotton tunics, and was then very little worse for wear.

Incandescent gas lighting has also drawn very largely upon Ramie supplies, Germany alone consuming 150 million of mantles per annum. This fact alone will give a general idea of the vast consumption possible if the rest of Europe adopts incandescent gas lighting on the same scale as Germany. Indeed, to such an extent is it used for this purpose

that nearly all the Ramie sent to England is re-exported to France and Germany for the manufacture of gas mantles.

It may naturally be asked why has not this wonderful textile come to the front before and been more universally used. The answer simply is that it is only within the last few years that a satisfactory process of degumming has been discovered and machinery adapted for spinning and weaving, thereby bringing the fibre down to a price which will compete with other fibres in the market. At one time manufacturers attempted to spin the fibre with machinery suitable only for cotton, wool and flax, but these efforts ended in failure. It was realised eventually that success in Ramie spinning could only be attained by the use of machinery specially invented, and their employment has rendered it possible now to use Ramie fibre with commercial success.

CULTIVATION.

The Ramie plant is easy to cultivate and thrives in almost any soil, but is especially adapted to a naturally rich, moist soil of a light loamy character. In China it is usually grown on a red clay containing sand. In the United States it has been cultivated experimentally on a great variety of soils, and it has been found that the plant grows best on light, sandy, alluvial soils, although it will flourish on any good soil that is capable of retaining its moisture. In order that the growth of the stems may be rapid and continuous a warm and moist climate is required during the growing season.

The Ramie plant withdraws from the soil a large quantity of valuable constituents. As only a small proportion of these materials is contained in the fibre it must be advantageous on general principles to return as much as possible of the refuse of the crop to the land. Experience has shown that without liberal general manuring the yield of fibre diminishes, and that the application of organic manures, such as liquid manure, farm-yard manure, guano, or oil cake, is very beneficial. These fertilisers can sometimes be supplemented with artificial manures. The propagation of Ramie is effected by means of seed, cuttings, or layers, and by division of the roots.

Propagation by Seed.—A stock of plants is easily raised from seed if the following instructions are observed:—

The seed is very fine, and should be sown in pans or shallow boxes about six inches deep, with holes bored in the bottom to allow free drainage.

First put in a good layer of broken brick or cinders, then a little rough fibrous soil or decayed leaves, and fill up to within an inch of the top with fine soil. Give a watering with water-can, then sow the seed thinly and evenly, and cover very lightly with finely sifted soil, a mere sprinkling, and only just sufficient to cover the seed.

The pans or boxes must not be exposed to sun or rain, and it will be necessary to cover with glass and lay over this a sheet of paper, which

latter may be removed when the seedlings are through, taking care that they are not exposed to the direct rays of the sun for some time. While the seedlings are small water should not be applied on the surface except in the form of a fine spray. The better plan is to immerse the pan in water for a few seconds, allowing the water to rise through the bottom till the surface appears moist, but not a moment longer.

When the seedlings are large enough, prick out into larger boxes about three inches apart, till they are about three or four inches high. They should then be transplanted into a well-prepared nursery bed, well trenched and manured, about a foot apart.

The following spring they may be planted out in rows, four feet apart and two and half feet apart in the rows, or about four thousand plants to the acre. When the plants are strong enough division of the roots is the most easy and expeditious way of raising plants for stock. The lateral shoots may also be pegged down and will root freely. They may also be propagated from cuttings, which strike easily if kept moist, so that a stock of strong plants if once obtained may be increased twentyfold every season with ease. Any bit of woody stem will grow, but they should in all cases possess at least three buds, with about a quarter of an inch allowed at each end beyond top and bottom buds. The cuttings should be made in spring from those parts of the stem that have turned brown. The plants will thrive in almost any kind of soil except stiff clay or very wet ground. They cannot endure stagnant moisture. The ground must in all cases be well drained and not liable to become water-logged. Though the plant will endure long drought without injury, the roots will be killed in a few days by a swampy condition of the soil. The crop depends on the nature of the climate, the growth being naturally slower in a cold than in a warmer climate. Under favourable conditions four crops of *Ramie* stems may be counted upon every year, and under extraordinarily favourable conditions—that is, where irrigation of the soil can be regular—six crops a year can be obtained. The most recent and careful experiments, quoted by Herr Boeken, give an estimate of forty-five stems to every plant, that is, with four crops on an average 180 stems per plant per year, and calculating the stems to yield 5 per cent. of fibre, would at the rate of 4,000 plants to the acre produce about two tons dry fibre per acre. Other authorities give the output of fibre as between 2 and 3 per cent. of the stems, but this must obviously vary according to climate, rapidity of growth, and the thickness of the stems. There appears to be no doubt that large areas in Natal are suitable for the growth of *Ramie*. Whether it will pay in the higher and colder parts of the Colony, where the growing season may be curtailed by late spring and early autumn frosts, is doubtful, and will have to be ascertained by actual experiment. The stems are ready for cutting when they turn brown, and just as the flower forms. They are cut near to the ground and put

through the decorticating machine. The fibre is then dried and baled and shipped Home, where the degumming is done. The plantation continues to yield for sixteen or eighteen years. It is continuous, and yields a regular crop, and is not, like cotton, so subject to failure. It has another great advantage over cotton and most crops, inasmuch as it does not suffer from the ravages of insects to the same extent on account of the large quantity of tannin in the composition of the plant. It does not, like most crops, spoil if not harvested at the proper moment, a great advantage when other crops demand attention imperatively. Ramie can wait. Another point in favour of Ramie is that the planter gets a quick return. It can be reaped the second season from seed and the first season from planting. As to the disposal of crops by small growers who may not be prepared to invest in the necessary machinery, their requirements will no doubt be fully met by private enterprise (as in the case of their wattle bark at the present time), and that decorticators will be set up in suitable centres, where the grower may dispose of his crop of Ramie stems as they are reaped; or the larger planter, who has a machine, may take the crops of the smaller growers around him.

As regards profit, Ramie is fetching to-day over £30 per ton of ungummed fibre. At £30 Ramie would come into competition with flax. If the price fell as low as £20 it would enter into competition with most fibres, and there would be an unlimited and extending demand.

One authority states: Ramie fetches to-day £32 per ton, that he has had to pay as much as £40, although he had bought as low as £18, and that it can be grown at an average price of £7 or £8.

With regard to the cost of growing, however, much depends on the economic conditions of the country where it is grown, price of labour, etc.; therefore the planter must experiment for himself and prove the suitability of climate and soil by growing an experimental area. He should then ascertain that the fibre grown is of the right quality to demand a market, by preparing and sending Home a small consignment for examination and report. Such samples should consist of about 1 cwt. of the ribbons, and should be carefully dried and baled before export. They may be either baled full length or doubled, but must not be cut.

DECORTICATORS.

Several decorticating machines for treating the stems on the ground as they are reaped are now in the market. The *South American Journal* of July 7th, 1906, says of the "Imperial Duplex Decorticator":—At present Ramie is chiefly exported from China in the form of what is known in the market as "China Grass," realising in London from £30 to £40 per ton. The Chinese, by hand labour, strip the Ramie fibre from the stalk of the plant, and by recourse to very primitive means, subsequently scrape the brown bark from the fibre strips. The maximum amount of fibre hand-scraped daily by a Chinese labourer is 10 lbs., and the grade of the product is necessarily uneven. It thus takes one man

about 224 days to produce one ton of fibre, while with the Imperial Duplex Decorticator one man will in one day produce at least one ton of fibre of superior and perfectly even quality at infinitely less cost per ton. This machine, in fact, requires no skilled attendance, can be worked by manual, horse, or any other power, and owing to its compactness and portability is capable of being removed from field to field with facility. The transport of an enormous quantity of waste material is thus saved. By its means planters will now be placed in a position to decorticate long stem fibres profitably where the process of decorticating by hand has hitherto been practically impossible owing to the expense. The "Aquilaes" decorticator, manufactured by Messrs. Boeken and Co., Duren, Germany, has also been favourably reported upon as capable of producing fibre similar to hand-cleaned China grass, particulars of which may be obtained from Mr. Caesar Rositzky, Port Shepstone.

Mr. T. R. Sim, Conservator of Forests, who is now in England in connection with the Colonial Exhibition, is making full inquiries as to the best machine to get out, cost, etc., so that further information on this point will soon be available, and will be published in due course.

Savage Stallions.

G. S. L., in the *Live Stock Journal*, writes:—When the numbers of stallions are duly considered, and it is realised that the power of the animals is so enormous, it is wonderful that so few accidents occur, and that when they take place certain faults in management can be traced. The Shire horse, or Clydesdale, is very formidable in appearance, but when they are seen in a show ring, with frequently a small active man maintaining absolutely perfect manners, there is proof that the horses are intelligent and affectionately inclined towards those who tend to their requirements. The man who is well qualified to lead a stallion should always be fearless, as there is nothing a horse detects sooner than want of nerve, but caution should also be observed. The quietest horse may be upset or have a fit of ill-humour, or he may in play grab at his attendant with very bad consequences. It is therefore wise to have the tackle arranged in accordance with safety to the greatest extent possible, and to make it a habit to be reasonably on guard. Amongst those who have made leading stallions quite a profession I have only known of one fatal accident, and that was to a farmer called Hannaford, who fairly loved going about with them from the time he was a boy, but he was savaged and killed at last by a cart stallion he had led for some considerable time. Another South Devon farmer called Shinner boasted that he led a stallion for fifty years to Newmarket once a week, and had never had a mishap in any way, although his stallions had been cart horses, thoroughbred horses, and pack horses. He rode the last-named

pretty regularly in steeplechases, or he would ride them trotting on a high road at sixteen miles an hour. Contemporary with him was old Tucker, as they called him, and he must have been fifty years leading stallions of all kinds. There was a horse in the South Hams called Rainbow, some fifty years ago, that belonged to a Mr. Elliot. The latter's son, a very good horseman indeed, rode Rainbow, who was a half-bred with, it was said, some Shire blood in him, in several steeplechases; but the horse got a bad character through the man who was employed to lead him being often the worse for an over-indulgence of beer. On one occasion news reached young Mr. Elliot that the horse was running loose about the roads, and that neither the police nor anyone else dared to touch him. Losing no time, Mr. Elliot drove to the scene of action, very quickly caught the Tartar, and placed him in safety. In later years Rainbow got into the hands of old Tucker, who when past sixty years old rode him in steeplechases, and led him regularly for several seasons.

There have been some terrible savages among thoroughbred horses. A horse called Lucerne by Swiss, out of a Prime Minister mare, was sent to France, where he was regarded as a sort of curiosity, as no one could go near him. He had to be fed through a window and his place cleaned from under a door. Lottery was very dangerous, both when in training and at the stud. His owner, Mr. Watt, was so apprehensive of serious mischief being done by him that he wished to have him shot, but, being persuaded to sell him, he parted with him for 470 guineas, the purchaser subsequently refusing 3,000 guineas for him. He once rushed at a farm labourer, and would lie down and roll to get his jockey off. He was managed, however, to become one of the best long-distance racers in England, and the sire afterwards of Liverpool, sire of Lanercost and of Sheet Anchor, sire of Weatherbit, sire of Beadsman. The Baron, sire of Stockwell and Rataplan, was quite as bad in his temper as Lottery, and he would have got more great stock in France if he had been more manageable. Several of the Irish Birdcatchers had very bad tempers besides The Baron, as there was Knight of St. George, the winner of the St. Leger in 1854. When brought from Ireland in 1853 as a two-year-old he was quite unmanageable, and considered a dangerous savage. Basham took him in hand for the winter, and gradually by gentle treatment brought him under control. Basham eventually won the St. Leger on him. A still greater sinner in the way of temper, and again an Irish Birdcatcher, was the grey Chanticleer, as he was a perfect mad horse when Mr. T'Anson had him in training, and on one occasion it was necessary to get his boy out of the box through the window. Sometimes he would bellow like a bull, and no one was safe on the training-ground with him. Augur might be cited as another bad-tempered Irish Birdcatcher, as well as others of the same breed. Beadsman appears to have inherited the Lottery stain of ill-temper, as he was that way inclined in training, and became a brute at the stud. He savaged the man who was leading him one day, and bit half his hand off, Sir Joseph Hawley settling a weekly pension on the sufferer for life in consequence. On another occasion an artist was engaged by Sir Joseph to paint him, and he was racked up in his box for that purpose. All of a sudden he plunged back and broke the rack chain. In a moment he was on the unfortunate artist, who defended himself for all he was worth with the easel, and

screamed for help. Tweed, the stud groom, was luckily not far away, and beat the infuriated animal off with a stick.

The American horse-tamers Rarey and Loffler tried their hands on some of these savages—Lord Dorchester's Cruiser, for example—but their lessons never appeared of a lasting order. They would be quieted for a time and then break out again. One can imagine very severe races souring the tempers of horses, and an instance of that is given in the case of Yellow Jack, a Birdcatcher certainly, but he was second in the Two Thousand, Chester Cup, Derby, Ascot Derby, Goodwood Cup, and in a sweepstake at Doncaster—six races in succession—and as the second horse he was, of course, the recipient of punishment in all. At the stud he was an incorrigible savage, and the very opposite to his half-brother, John Davis, who did his share of work, too, but was of the most charming temper. The latter, however, reminds one of Beaudesert, a dreadful horse, and got by Sterling, dam by John Davis.

Rosicrucian had none of his sire Beadsman's temper in his younger days, but at one time in his life he contracted fits of ill-humour and got a bad character. In his change of quarters to Middle Park he was attended by two men, and on his arrival at Eltham Station the services of three porters were requisitioned as well, with tackle enough on him sufficient to hold about two bulls. Mr. William Blenkiron could not understand what was coming down his carriage-drive as the dangerous little brown and his guardians hove in sight. The moment he got to his box he ordered all the tackle—the crupper, bearing-reins, muzzle, chains, etc.—to be taken off, with instructions at once to his staff also that only one man was to take care of him. In a very few weeks Rosicrucian was as a lamb, and remained so to the end of his life. He was at Doctor Freeman's in his very old age, and I remember caressing him there with as much confidence as I should have done a pony. He had a son called Chevron, out of Cognisance by Stockwell, that was purchased when just out of training by the late Mr. Watson, of Waresley; and, whether by accident or otherwise, he became terribly vicious, and grew worse and worse. He got some very promising stock before he died—rather prematurely, and on Mr. Watson being consoled with his loss that gentleman replied, "I am a loser, certainly, but as he gave me continual anxiety as to whether he might not kill his man, I am very glad he is dead." The recently deceased W. G. Stevens had similar fears about Despair, who never improved in his temperament, and once nearly settled his owner by savaging him on the training-ground. There are cases in which no sort of treatment has resulted in the improvement of an evil disposition. The father and son, Solon and Barcaldine, were instances of that, but, like of Knight of St. George and Rosicrucian, many have been changed into the very quietest after quitting the racecourse for the stud. Lowland Chief always wore a muzzle when in training, but under Castle, Lord Ellesmere's stud manager's care, he had no such adornment, and was as quiet as he could be. Orme caused uneasiness after he had been at the stud some little time, as he appeared to develop an ungovernable temper, but he was coaxed into an easy disposition again, and, oddly enough, his famous son, Flying Fox, after being regarded as difficult to train and ride owing to an irritable temper, quieted down into a sort of pet for his French groom to take care of.

The sharp or even bad tempered ones, of no matter what kind—

racers, Shire, or Hackney—are worth trying experiments upon in regard to management and gentle treatment. The great Eclipse, the forefather of all the first racers and hunters for the past 150 years, was very nearly unsexed and lost owing to a character he obtained for temper, but rescued by almost an accident. He beat everything of his day on the racecourse, and became the petted favourite of an adventurous but successful man, to live to the good old age of twenty-five, and to be regarded as perhaps the most famous stallion ever known.

Veterinary Departmental Reports for Month of January, 1907.

MINISTER OF AGRICULTURE,—

I forward herewith my monthly report and those of the D.V. Surgeons and Stock Inspectors for the month of January, 1907.

Sheep Scab.—Four outbreaks of this disease and 30 licenses raised during the month.

Lungsickness.—Five outbreaks of this disease during the month.

Glanders.—One animal destroyed in Alexandra County, 2 in Weenen County, and 1 at Babanango.

Horsesickness.—139 deaths reported as under:—Ladysmith, 7; Vryheid, 14; Dundee, 13; Alfred and Alexandra Counties, 10; Umvoti, 10; Weenen County, 8; Durban, 22; Upper Umkomanzi, 2; Zululand, 12; Ixopo, 1; Lion's River, 2; Babanango, 1; Underberg, 4; Newcastle, 4; Utrecht, 3; Pietermaritzburg, 20; Paulpietersburg, 6; total, 139.

A large number of mules are now being immunised under Dr. Thieler's system of inoculation, and the demand for these animals is increasing daily.

If Dr. Thieler can continue to supply the necessary serum and virus, it is hoped that a very large number of immunised mules will be ready for issue at an early date.

East Coast Fever.—During the month the following outbreaks occurred:—Vryheid, 12; Lower Tugela and Mapumulo, whole district looked upon as infected; Dundee, 1; Umvoti, 1; Weenen, 1; Durban, County, 13; Mahlabatini, 1; Ndwandwe, 1; Hlabisa, 1; Paulpietersburg, 4.

The following deaths are reported:—Vryheid, 315; Lower Tugela and Mapumulo, 667; Dundee, 3; Umvoti, 14; Weenen, 8; Durban County, 33; Mahlabatini, 28; Ndwandwe, 497; Hlabisa, 44; Paulpietersburg, 99; total, 1,708.

D.V. Surgeon Donaldson, Stanger, states that he has discontinued showing the number of outbreaks in the Lower Tugela and Mapumulo

districts, as he now looks upon the whole of these Magisterial Divisions as infected.

I would draw attention to the number of deaths within the past month in these two districts, viz., 667, and during the past week over 300 animals have died in those districts.

W. M. POWER,
For Principal Veterinary Surgeon.

LADYSMITH.—D.V.S. WEBB.

Scab.—Ladysmith district has two flocks under license. Bergville district is now free from the disease.

Mange.—Ladysmith district has thirteen flocks under quarantine. Bergville South has five infected flocks.

Horsesickness and *Dikkop*.—Seven deaths are reported.

Tick conveyed diseases are now making their appearance. I have attended cases of Redwater, Heartwater, Biliary Fever, and Malignant Jaundice.

Heartwater.—Two cases were brought under my notice in town, both in calves. One calf was dead when I arrived, and I attended within ten minutes of notification; the other calf I was fortunate to see alive. This animal was apparently quite healthy when let out in the morning to suck, but immediately after sucking it had a fit and became quite unconscious. When an attempt was made to lift it to its feet the animal struggled violently until let down. The calf died about six hours after the fit, and a *post-mortem* examination revealed all the organs healthy with the exception of the heart; the "heart-bag" contained excess of fluid, the heart itself was covered with blood spots, and one auricle looked highly congested, the membrane lining the heart also showed blood spots and extrarotation.

In and around the Acton Holmes district several head of cattle have succumbed to a mysterious kind of disease and a few of the affected ones have recovered. Unfortunately I have not up to the present been given an opportunity to make a *post-mortem* examination. I have seen two whilst they were still alive. They showed no symptoms which were diagnostic of any particular disease. They lie about a good deal, walk with a certain amount of stiffness, and towards the last become paralysed in the hind quarters. When standing they hang their heads down and look almost as though they were feeding, and closer examination show they are not. I was inclined to think the trouble might be due to their having eaten some vegetable poison, but now I should not be at all surprised if we find them cases of Heartwater. I should be glad if stock-owners in this district would take particular notice of the "heart-bag" and heart should they get any more of these cases. At the *post-mortem* of the two calves previously mentioned I noticed that the urinary bladder was tremendously distended with urine; this is probably due to paralysis of the neck of the bladder.

Malignant Jaundice.—A chronic case of this disease in a pointer pup was brought to my notice. Examination of the dog showed anaemia, dropsy, and hydrothorax. The pup had been very ill some time previous to my being called in, and had to a certain extent recovered but was never able to pull itself together completely. I gave medicine likely to overcome the above mentioned symptoms and the dog appeared to rally for a few days, when suddenly it dropped dead. The *post-mortem* examination was interesting. The cause of the sudden death I found due to a fibrinous clot in the heart, the lining membrane of which showed roughened areas. The liver was enormously enlarged and congested, and there were large quantities of a serous fluid both in the chest and abdominal cavities.

Biliary Fever.—This case was a horse owned by Pagel's Circus, an imported American. The animal was noticed dull in the ring on the evening previous to my seeing it. The following morning I found the temperature 106 degs. F., pulse beats 90 per minute, respirations very much quickened, visible mucous membranes stained a deep yellow colour with patches of a purple hue.

I would like to draw attention to the treatment adopted in this case, a treatment which I have never heard of anyone else employing. I have used it now on six cases, and in each instance recovery has taken place; it is the intravenous injection of a solution of arseniate of soda. I make up a solution of one grain of this drug dissolved in one c.c. of boiled water and use 10 c.c. of the solution injected into the jugular vein at a dose, an injection to be made each morning and evening until the temperature is reduced to 103 degs. F. I find four or five injections usually sufficient. I tried this drug first of all subcutaneously, but it usually causes a large swelling to form at the seat of inoculation, and often an abscess results, but intravenously no ill effects occur.

This same treatment I have also found very successful in cases of Redwater in cattle.

It is surprising farmers in this district do not follow the example of those men in other districts who have built dipping tanks for cattle and horses, especially after the glowing accounts which men who possess tanks give of the good effects of regular dipping. I feel certain farmers would save numbers of their stock which at present succumb to tick-conveyed diseases if they would occasionally pass their stock through a tank filled with a combined arsenical and tarry dip, and I believe blue tongue in sheep and horsesickness are also preventable to a certain extent by such a periodical dipping during the sickly season.

VRYHEID.—D.V.S. BECKETT.

Horsesickness.—This disease has been prevalent during the current month. Fourteen cases have come under our notice, the majority being the pneumonic form. I also gather that losses have occurred throughout the district not reported to the Department.

Biliary Fever.—Several cases have occurred amongst horses and donkeys.

Blue Tongue.—Mortality reported, 50 sheep.

Vegetable Poisoning.—Four cases amongst cattle have come to my notice.

East Coast Fever.—Twelve fresh outbreaks of East Coast Fever have been reported during this month in the Vryheid and Ngotshe Divisions. The deaths from this disease have been numerous, and will be increasingly so as the infected area of veld extends. We now know of 101 infected centres in these districts, and there are doubtless others unreported. As camps are out of the question owing to the lack of reliable (clean) veld to work on, and farms are nearly all unfenced, I do not see how gradual spread of this disease can be checked by the means that we have at our disposal at present. The entire prohibition of cattle movement throughout the district would tend to check rapid advance, but would be of no avail ultimately, as there is nothing to prevent contact on the unfenced farm boundaries. The matter rests largely with farmers themselves, who can in most cases at least prevent stray cattle (particularly native cattle) mixing with their stock and crossing their boundary lines. Sufficient care is not exercised in this respect in many instances, and a disease such as East Coast Fever, which spreads by means of contaminated veld, could be largely controlled if this was rigidly carried out.

Schlerestomo Equina (Strongylus armatus and Tetricanthus).—Several cases have occurred this month amongst horses and mules. *Post-mortem* examinations have been made demonstrating their presence in the large intestine. In all cases marked enteritis was present, and in one instance perforation and peritonitis as a sequel. I am of opinion that the majority of cases in which horses are supposed to have been killed by bots are due to this worm, which is so small as to easily escape notice if not carefully looked for.

STANGER.—D.V.S. DONALDSON.

Total number of deaths from East Coast Fever reported during January, 667.

Number of cattle railed during month, 1,032 (without counting Militia cattle from Bond's Drift).

East Coast Fever has spread very rapidly during January, and, with the exception of one or two farms, is all over the district, and in many cases whole herds have died off. The majority of owners of cattle remaining are very anxious to sell.

MARITZBURG.—D.V.S. HARBER.

Sheep Scab.—Two flocks are under license, and the licenses of two flocks have been raised.

Mange in Goats.—One flock under license and one has been raised.

Anthrax.—This disease occurred among some natives' cattle at Albert. Five have died; also two natives from eating the flesh.

Glanders.—Fifteen horses were tested with Mallein with negative results.

Twenty horses have been examined for soundness. Four racehorses were inspected previous to their transit to the Transvaal. Four dogs were inspected also for Transvaal.

Biliary Fever.—Two cases have come under my notice, both of which recovered.

Horsesickness.—A few cases have occurred, and the indications point to a bad season. A number of mules have been subjected to the immunising process for this disease.

DUNDEE.—D.V.S. BRUCE.

East Coast Fever.—An outbreak occurred on the farm "Stockholm," adjoining the infected area "Ernscliffe," the source of infection being traced. A special report on this outbreak has already been sent you. The fencing-in of the infected areas in the Dundee and Umsinga Divisions is being proceeded with. The Dundee town lands are now completely fenced. Several prosecutions have taken place for breaking of the Regulations and convictions obtained, and there are several pending.

Lungsickness.—Five deaths. Three herds are under license in the Nqutu District and three in the Dundee-Umsinga district, also one in the Nkandhla district.

Epizootic Lymphangitis.—One horse destroyed on the farm "Bannockburn."

Horsesickness.—Thirteen deaths.

Anthrax.—One death.

Quarter-evil.—Seventeen deaths.

Other Causes.—Thirty-two deaths.

Scab and Mange.—Several flocks are under licenses, more especially in the Nqutu district.

PORT SHEPSTONE.—D.V.S. TYLER.

East Coast Fever.—There is nothing fresh to report regarding this disease, and the position remains very satisfactory so far. The infected area is completely fenced in, and I think we may count the extension of the disease from this centre as practically impossible. It is very gratifying that such should be the case, and the good results which have attended our efforts in dealing with this outbreak are chiefly due to the hearty co-operation of the residents of the district. If farmers all over the Colony took the same intelligent interest in this disease, and were prepared to acquiesce in the regulations for its suppression with the same good will

and thoroughness as has been shown by the people of Alexandra County, East Coast Fever would soon become a thing of the past.

Horsesickness.—This has been the worst month so far for Horsesickness, and there is every indication that this year will be a particularly bad one.

NEWCASTLE.—D.V.S. McNEIL.

Scab affecting Sheep.—No Scab now exists in either the Utrecht or Newcastle districts.

Mange affecting Goats.—Two licenses were raised during the month, leaving nineteen continued cases.

Lungsickness.—The outbreak reported early in December has confined itself to the single animal affected in the first instance.

As my term as Acting District Veterinary Surgeon for the Newcastle and Utrecht districts has now terminated, I beg to offer my sincerest thanks for the great assistance I have had from the Newcastle and Utrecht East Coast Fever Committees and for the faithful and painstaking manner in which they carried out their duties during my term of office there.

MOOI RIVER.—D.V.S. VERNEY.

East Coast Fever.—During the month a very serious outbreak of this disease occurred on the farm "Sutherland." The diseased cattle belong to Messrs. Cameron & Stevens; eight animals have died. There is no doubt, I think, that the disease has existed on this farm for some considerable time. I am unable to positively trace the origin of infection, but I think it is highly probable transport oxen from Stanger are responsible for this new focus of disease. I feel certain the outbreak of September amongst Mr. C. H. Rottcher's cattle has nothing to do with this outbreak. No clean pasture available, there is nothing left but to leave these animals to their fate. Unfortunately, the farm "Sutherland" is unfenced on the side adjoining the Crown lands, with the result that there are about 350 kafir cattle that have been grazing on or near the same veld. All the veld there is any reason to suppose is infected is being fenced in, and the cattle are all branded W2 on the left cheek.

In addition to this area we are also completing a ring of fencing farther away, so that should the disease have been carried farther away than we know of then we still hope to confine it within this fence. All cattle, approximately 3,000, are being branded with distinctive brands within this outer zone of fencing. It is a fortunate fact that this new outbreak has occurred within the original sub-infected area, otherwise there is every probability the disease would have been widely disseminated, for not knowing until recently there was infection amongst these cattle passes would have been given in the usual way, with the result that in all probability transport oxen would have broken down sick on the high road and so left the disease all along the high roads. It is cases of

this sort that indicate the wisdom of the restriction of the movement of cattle from one farm to another, and it is this ideal that cattle-owners should for a time aim at bringing about. If the movement of cattle can be put a stop to then there is every reason to suppose that East Coast Fever will soon be eradicated.

It is to be regretted that the price of mules is not within the reach of the purse of all farmers to-day. All farmers in Weenen County east of the line should now be careful to get a complete record of the kafir cattle on their farms, and I think the time has arrived when these cattle should bear some distinctive brand so that when the farmer is riding round his stock he would know at a glance that he has to deal with a strange beast. This marking of Kafir cattle on Europeans' farms would play a very important role in stopping secret movements of cattle from one farm to another, and unless we can guarantee to put a stop to the hiding of secret movements of cattle we cannot hope to control the spread of East Coast Fever. Several farmers whom I have spoken to on this matter have recognised the soundness of the suggestion and have put it into practice. The kafir in most cases has no objection to his master branding his animals with a distinctive mark, but I do not think it wise for the owner to use his own brand on the kafir cattle. All movement in the Magisterial Division of Weenen south of the Bushman's River has been prohibited. This, of course, will cause an enormous amount of inconvenience, which has to be faced. We are relieving the situation in the Middlerest district by supplying some mule transport. Farmers in these areas should make an effort to sell their fat stock and buy mules, as individual effort is always much more satisfactory than Government help.

Lungsickness.—Two oxen, the property of Mr. J. Bird, Mooi River, have died, and both *post-mortem* examinations revealed every indication of Lungsickness being the cause of death. These oxen had been doing Militia work. As Mr. Bird's cattle had mixed with all the cattle on the Western Commonage, all these cattle had to be put under license, which, of course, has caused a considerable amount of inconvenience. Since issuing the license one ox developed sickness and showed every clinical symptom of Lungsickness. This ox is recovering. The origin of this outbreak is not clear, but it is significant that loot stock at Dundee and transport cattle at Krantzkop have developed Lungsickness.

Glanders.—Stock Inspector Koe reported to me that he had put two kafir horses under quarantine, the property of native Mgadatana, on Moord Spruit, as they showed every symptom of Glanders. I visited these horses and found them both suffering from chronic Glanders, one of them in a dying condition. Both of these horses were destroyed. There are thirteen kafir horses on Moord Spruit, and these animals I am testing with Mallein. There is no doubt whatever that one of these horses had suffered from Glanders for at least two years, and it is for-

fortunate that these horses had not been in the habit of being stabled with other horses. An outdoor existence with plenty of space is no doubt inimical to the attack of Glanders bacillus. The origin of the outbreak is not clear, but one of the horses originally came from the Military. The Magistrate at Estcourt has kindly called up the natives on Moord Spruit and explained to them the disease and the law regarding the Mallein test. I have also asked the Magistrate to request all natives to report any horses that they observe has a discharge from the nose.

Redwater.—There has been a considerable quantity of Redwater in cattle. I anticipate much more before the winter.

DURBAN.—D.V.S. AMOS.

The importations by sea have been as follows:—

Sheep	268
Dogs	40
Horses	18
Mules	2
Total	328

Two hundred and sixty-two sheep came from Australia, and the remainder from England. All the horses came from England, and were chiefly thoroughbred racing stock. Two mules came from North America. Dogs chiefly came in the transports from India, the remainder came from England and Cape Colony.

Lungsickness, Tuberculosis and Glanders.—Nil.

Horsesickness has fluctuated, some weeks many deaths being reported, in other weeks no deaths have occurred. Twenty-two cases, chiefly of the Pulmonary and Blue Tongue variety, have been reported, but doubtless many other cases have occurred but have not been reported.

East Coast Fever.—This disease has been held in check, but many fresh outbreaks have occurred within the infected areas. This is not to be wondered at when you know the number of cattle that is contained within that area. Thirteen fresh outbreaks have occurred, thirty-three deaths from the actual disease took place; thirty-six animals were removed for slaughter, and two animals were destroyed for straying. This work has entailed a great amount of supervision, but our efforts are rewarded as long as we confine the disease to the restricted area.

Epizootic Lymphangitis.—Nil.

During the month I have carried out immunisation against *Horsesickness* on 350 mules at the Compound. I have specially reported upon this work to you, and, as you know, it has entailed a great amount of hard work and has kept me very fully occupied. The majority of the mules

are now through their immunisation for Horsesickness, and about 100 of them have been inoculated with "Biliary Fever virus."

This work has meant the employment of extra European and native labour.

During the month I purchased donkeys for the Department, and these are being issued as required by people in the northern districts.

Ornamental Seeds.

"THE use of ornamental seeds in the manufacture of household articles and for personal adornment is common in many countries," says the *Kew Bulletin*, "but in few perhaps has the application of natural forest seeds become an industry so definite as appears to be the case in Mazagon, Bombay."

This industry was described in an article in the *Times of India* for July 13th, 1906, the following brief summary of which may be of interest:

The Indian jungles are remarkable for the number of hard, bright seeds of many colours which are found upon their trees and climbing plants. The beauty of many of these seeds and their durability must have suggested their use as ornaments, but the difficulty of piercing them regularly and cheaply seems to have stood in the way until the Editor of the *Indian Textile Journal* took the matter in hand.

The drilling of the seeds was the first problem to be solved, and as they varied greatly in shape, appliances had to be devised that would hold them and at the same time guide the drill so that it might pierce them in the desired manner. The seeds were finally held in an instrument resembling a nut cracker with conical recesses on the inner sides which held the seeds, and a hole passing through the apex of the cone which guided the drill. These "clamps" were made of hard Indian wood, while the steel of knitting needles and old bicycle spokes was found to be of excellent quality for drills.

The typical machine now consists of small horizontal drill-heads arranged along a narrow table which accommodates six drillers. The clamp holding the seeds rests upon a small adjustable bracket, which supports it at the level of the drill point; and power is applied by a coolie who turns a woden wheel at the end of the table. A cord from this wheel makes a single turn around the small pulley of each drill and returns above them to the wheel. One labourer thus serves six drills without any complication of mechanism.

The seed and bead industry is interesting for several reasons. It is based on the use of materials which were previously without value, and these materials are worked up with the aid of new tools and appliances designed expressly for them under very strict limitations as to cost and complication. It should take a prominent place among the small industries of India.

Among the charming devices produced from these ornamental seeds are necklaces, napkin-rings, hat-pins, buttons, bracelets, seed-partieres, and screens, which find a ready sale at remunerative prices.

Meteorological Returns.

Meteorological Observations taken at Government Stations for Month of January, 1907.

STATIONS.	TEMPERATURE (IN FAHR. DEGS.).				RAINFALL (IN INCHES).						
	Means for Month.		Maximum for Month.	Minimum for Month.	Total for Month.	No. of Days.	Heaviest rain-fall in 1 day.		Total for Year from July 1st, 1906.	Total for same per'd from July 1st, 1906.	
	Maximum	Minimum					Fall.	Day.			
Observatory ..	82.8	68.4	90.7	68.2	3.02	22	.78	11th	24.9	20.49	
Stanger ..	88.9	67.4	107	63	4.99	22	1.02	17th	26.99	22.39	
Vernham ..	92.8	69.2	106	62	5.99	14	3.6	6th	22.82	17.91	
Greytown ..	90.8	50.5	100	45	5.84	18	1.65	9th	20.45	17.39	
Newcastle ..	85.0	62.3	96	54	7.70	15	2.05	16th	31.44	18.18	
Mid-Illovo ..	80.4	61.3	96	56	3.16	20	.59	7th	23.70	18.04	
Escoort ..	88.9	59.1	100	52	5.05	13	1.40	24th	16.91	15.32	
Impendhle ..	78.4	53.3	84	47	8.45	20	3.89	9th	24.60	...	
Camperdown ..	81.3	59.6	93	50	4.27	10	.94	6th	22.73	1.89	
Port Shepstone ..	82.3	61.6	93	52	2.71	12	.54	13th	25.38	25.87	
Umtinto ..	92.2	55.3	99	53	1.93	12	.47	1st	25.30	22.2	
Richmond ..	80.1	59.2	93	49	6.66	20	1.51	6th	20.24	22.48	
Maritzburg ..	82.5	61.2	93	56	5.50	20	.92	9th	.672	15.69	
Howick ..	80.0	58.5	94	54	5.24	19	1.09	9th	24.13	15.02	
Dundee ..	82.0	62.9	93	55	4.06	17	.32	30th	20.85	14.48	
Weenen Gaol ..	90.9	61.4	105	57	7.14	18	2.36	25th	18.61	15.30	
New Hanover ..	84.5	60.4	97	52	8.80	17	1.30	17th	30.33	18.41	
Charlestown ..	76.2	54.9	84	48	11.88	16	2.75	31th	35.45	...	
Nongoma ..	79.7	53.1	90	40	9.38	12	3.20	9th	32.02	15.98	
N'Kandhl ..	86.2	54.7	96	50	2.72	13	.41	28th	23.53	16.87	
Vryheid ..	84.6	58.6	91	53	6.18	14	1.34	29th	25.51	...	
Umlalazi ..	85.2	53.2	90	35	9.40	13	2.10	10th	...	20.97	
Hlabisa ..	82.1	62.2	95	59	8.56	9	2.50	18th	32.69	19.51	
Ubonbo ..	81.8	62.7	83	56	7.76	12	2.65	9th	35.66	...	
Point ..	...	...	...	...	3.95	13	.68	28th	26.58	20.43	
Nqutu ..	80.2	58.9	92	52	7.09	13	.66	9th	...	13.53	
Ingwayuma ..	83.3	63.0	95	55	8.95	12	2.5	1st	...	...
Mahlabatini ..	82.8	59.7	96	50	7.25	18	1.94	28th	24.62	15.46	
Amatikulu ..	88.9	67.1	105	62	3.46	16	.48	10th	19.37	...	
Empangeni ..	...	...	...	...	4.05	9	1.49	11th	23.77	21.4	

Meteorological Observations taken at Private Stations for Month of January 1907.

STATIONS.	TEMPERATURE (in Fahr. Degrees.)		RAINFALL (in inches).						
	Maximum for Month.	Minimum for Month.	Total for Month.	No. of days.	Heaviest Rain-fall in one day.		Total for Year from July 1st, 1906.	Total for same per'd from July 1st, 1906.	
					Fall.	Day.			
Central Experiment Farm, Hill (Mangr.) ..	98	52	4.20	14	1.50	28th	22.74	18.14	
Experiment Farm, Weenen (Manager) ..	100	56	8.54	13	3.42	25th	20.68	8.02	
Experiment Farm (Winkel Spruit) (Mgr.) ..	91	62	.92	15	.32	1st	24.69	25.33	
Nottingham Road (C. J. King) ..	...	...	8.26	25	1.84	20th	30.35	21.27	
Adamshurst (Wm. Adams) ..	91	51	4	20	.30	9th	19.98	14.19	
Hilton (W. Engel) ..	90	52	7.75	21	2.59	28th	22.99	17.53	
P.M.B. Town Bush Valley ..	...	...	6.34	17	1.11	14th	32.79	21.94	
Mid-Illovo (A. N. Montgomery) ..	96	56	3.16	20	.59	7th	23.70	18.68	
Ottawa ..	...	...	6.18	15	2.24	6th	24.45	18.98	
Mount Edgcombe (Natal Estates) ..	98	65	5.84	15	2.20	10th	29.44	19.92	
Cornebisa (G. Wilkinson) ..	...	...	5.18	...	...	...	31.96	17.76	
Millwood-Kraal ..	...	...	2.72	...	...	...	21.69	15.92	
Blackburn ..	...	...	5.21	...	...	...	24.38	16.91	
Seckelham ..	...	...	5.36	...	...	...	25.68	19.06	
Esquema (W. Hawkesworth) ..	96	68	2.11	17	.79	16th	29.66	3.94	
Umtinto, Benaya (E. W. Hawkesworth) ..	...	...	2.98	14	.81	16th	39.21	30.71	
Brankholme (Charles Scott) ..	...	...	10.03	20	1.53	9th	41.14	24.48	
Impendhle (E. Hill) ..	...	...	...	...	...	...	...	23	
Blot Vlei (P. Otto, J.P.) ..	...	...	8.49	16	1.77	10th	18.02	...	
Da van (J. Potzenhauer) ..	...	...	5.41	16	1.60	7th	23.66	...	

Coal and Labour Return.

Return of Coal raised and Labour employed at the Natal Collieries for the month of January, 1907:—

Name of Colliery.	Labour Employed.						Unproductive Work.*			Output.	
	Above Ground.			Below Ground.							
	E.	N.	I.	E.	N.	I.	E.	N.	I.	Tons.	Cwt
Natal Navigation ..	28	98	321	18	263	208	4	9	—	22, 63	10
Elandsbaagte ..	18	15	230	17	210	456	12	30	28	15,439	13
Durban Navigation ..	21	120	55	11	31	47	1	20	—	12,356	0
Glencoe, Natal ..	14	116	86	12	494	7	—	—	—	11,147	9
Natal Cambrian ..	15	34	125	11	250	63	—	—	—	9,806	0
South African ..	7	8	107	10	210	72	5	24	45	9,350	9
St. George's ..	16	75	158	10	163	113	1	6	—	8,067	0
Dundee Coal Co. ..	8	11	156	9	43	347	10	—	1 0	7,603	5
Newcastle ..	8	39	25	7	621	3	3	6	—	5,505	16
West Lennoxton ..	5	2	63	2	32	107	—	—	—	3,142	10
Natal Steam Coal ..	2	36	4	2	120	3	2	6	—	2,7 3	8
Ramsay ..	2	5	62	3	55	103	3	5	8	2,077	5
Central ..	—	—	—	—	—	—	—	—	—	1,517	10
Talana (Natal) ..	—	9	25	2	30	50	2	2	5	1,005	0
Zululand ..	1	26	—	1	39	—	4	20	—	554	—
Woodlands ..	1	5	4	1	6	3	—	—	—	50	—
Totals	149	589	1,421	116	2,492	1,585	47	128	195	112,509	1
Corresponding month, '06	145	599	982	113	2,091	1,324	30	156	155	99,358	3

* Cost charged to Capital Account.

† Labour Return not received.

Maritzburg,
7th February, 1907.

CHAS. J. GRAY,
Commissioner of Mines.

Return of Coal bunkered and exported from the Port of Durban for the month of January, 1907:—

	Tons.	Cwt.
Coal Bunkered ..	49,862	7
Exported to:—		
Cape Colony ..	13,112	15
Beira ..	107	19
Mauritius ..	48	0
London ..	1	4
Swakopmund ..	50	0
Total ..	63,182	5

(Signed) GEO. MAYSTON,
Collector of Customs.

Custom House, Port Natal,
1st February, 1907.

A new kind of papaw has been introduced in St. Kitt's. It is called the Guinea papaw. The fruit is much superior to the common papaw or to the long cucumber-like fruit known as the Barbados papaw. The pistillate flowers are white. The fruit is shorter than the common papaw, precisely melon shaped, with the five ridges more distinctly marked, and of a deeper green when unripe. The ripe fruit is often very large and has a thicker, juicier, sweeter pulp than the other papaws, with a superior flavour. Remembering the potent digestive qualities of papain, this new papaw is worthy of a place in every West Indian orchard.—*Agricultural News, Barbados.*

Return of Farms at Present under Licence for Lungsickness and Scab.

STOCK INSPECTOR.	DISTRICT.	DISEASE.	OWNER.	FARM.
A. P. Crow	Ladysmith	Scab	Gengen	Roodeport
J. R. Cooper	Nkandhla & Ngutu	"	A. MacPherson	Avonford
		"	M. Modweni	Dalala
		"	B. Butelezi	"
		"	B. Ndhlovu	"
		"	M. Ndhlovu	"
		"	C. Sekosana	"
		Lungsickness	N. Gobose	Malogato
		Scab	M. Gobose	Lower Blood River
		"	S. Zungu	Delala
		"	O. Molife	Telezi
		"	D. Ndhlovu	"
		"	M. Setole	Delala
		"	M. Mgune	Blood River
		"	S. Zungu	Delala
		"	S. Molife	Telezi
		"	D. Ndhlovu	"
		"	M. Setole	Delala
		"	M. Mgune	Blood River
		Lungsickness	L. Makoba	Middle Drift
S. A. Brown	Underberg	Scab	N. M. tenjeni	Nquebeni
		"	J. A. Stone	"
		"	T. de C. Arbuckle	Kerridge
		"	B. Phipson	Strathcampbell
		"	M. Fraser	Winterhoek
		"	E. C. Gold	Woo end
		"	J. R. Royston	Greenend
		"	J. van Whye	Silburn
		"	F. A. Hathorn	Sanguana
H. van Rooyen	Vryheid	"	Jonas	Witpoort
		"	Mjebe	Fresgewacht
		"	Machaba	Rooipoort
		"	Mgeslo & Co.	Hardscamp
A. B. Koe	Portion of Estcourt	"	J. W. Moor	Moorleigh
A. J. Marshall	Dundee	"	A. W. J. Hitting	Koplagte
		"	R. J. du Bois	Giba
		"	J. W. de Bruyn	Rooifontein
		"	C. M. Vermaak	Paddock
		"	L. W. Meyer	Langverwacht
		"	A. L. Jansen	Strathearn
		"	J. O. Nel	Karncliffe
		"	A. C. Vermaak	Sigtuna
		"	T. C. Vermaak	Harriotsdale
		"	H. Vermaak	Paddock
		Lungsickness	Govt. Loot Stock	Goodekeus
E. Varty	Western Umvoti	"	T. J. Nel	Mt. Ernestina
J. J. Hodson	Ptn of Lion's River	"	W. J. Slatter	Edm Lacy
		"	A. K. Murray	Shawlands
		"	Mrs Vear	Brookdale
H. W. Stratford	Newcastle	Lungsickness	H. Kumalo	Mossendale
B. Mayne	Krantzkop	Scab	W. W. Mare	Doomhoek
		Lungsickness	P. R. Nell	Broeder's oek
		"	Maqanganse	Loots Hoek
		"	Uqupu	Myoniezwe's Locat'n
		"	Ndabane	"
		"	N. Johnson & Co.	Inadie Store
G. Daniell	Vryheid	Scab	J. R. Steenkamp	Bloemhof
		"	G. Combrink	Goedehoop
		"	D. Coetzee	Rustplaats
H. Mayne	Eastern Umvoti	"	P. R. Botha	Mountain View
		"	J. J. Brokhorst	Vlak Vlak Vlaakte
		"	Halen	O iverfontein
		"	J. J. van Rooyen	Overvleit
		"	S. C. van Rooyen	Small Hoek
		"	W. Cadle	Fairfield
		"	C. van Rooyen	Boschfontein
		"	A. Nel	Glen Boig
J. Burton	Portion of Estcourt	"	G. Ross	Roslin
		Lungsickness	J. Bird	Mool River Tn Lds.
A. S. Parkinson	New Hanover	Scab	Swaiban	Location
H. C. Jarri	Ixopo	"	Huluma	Batman's farm

MANGE IN HORSES EXISTS AS UNDER.

Name.	District.	Name.	District.
W. E. Oates ..	Bergville	Nseleni ..	Underberg.
H. Turner ..	Lidgetton	A. G. Stafford ..	Harding
A. M. Campbell ..	"	C. Harding ..	Weenen
Mboyee ..	Bergville.	B. Thompson ..	New Leeds

Market Reports.

(Responsibility for the accuracy of the Statements and Opinions of the following Reports rests with the respective Contributors.)

MARITZBURG.—Messrs. W. H. Walker & Co. write: From all parts of the Colony comes the same information, viz., that it is years since Natal has been visited with such storms and heavy downfalls of rain. Unfortunately in some districts severe hail storms have destroyed fruit, and injured growing crops. Of course, it is too early to predict what the crops will be like, or the quantity reaped, but if there is no more hail, and we have a fair amount of sunshine, a record crop of mealies may be expected. Prices are about the same, in most lines, as last quoted.

Mealies.—Prices are about the same as last quoted, viz., from 6s. 4d. to 6s. 10d. per 100lbs. There seems an indication of prices being easier in the near future.

Forage.—Market well supplied with baled forage, realising from 5s. 10d. to 6s. 6d per 100lbs. for good samples; inferior, about 2s. 10d. to 3s. per 100lbs.

Hay.—Notwithstanding the rain, the market has been fairly supplied with hay selling at from 1s. to 2s. per bale of about 60lbs.

Kafir Corn.—The price depending in a great measure on quality. Market well supplied, and prices have fluctuated between 3s. 11d. to 7s. 2d. per 100lbs.

Beans.—Good samples have realised from 12s. 3d. to 14s. per 100lbs.; others from 7s. to 10s. per 100lbs.

Peas.—Good seed selling from 13s. to 15s. per 100lbs.; inferior, from 7s. 3d. to 7s. 9d. per 100lbs.

Barley.—A few samples have realised about 12s. per 100lbs.

Potatoes.—Market well supplied with good table varieties, realising 6s. 3d. to 6s. 6d. per 100lbs; some samples, however, were as low as 2s. per 100lbs.

Onions.—Sound dry onions selling at 4s. 3d. to 7s. 3d. per 100lbs.; inferior from 2s. to 3s. 6d. per 100lbs.

Sunflower Seeds.—From 8s. 6d. per 100 lbs.

Pumpkins.—Large pumpkins realised from 3s. 6d. to 6s. 3d. per dozen; small, from 9d. to 1s. 6d. per dozen.

Eggs.—Fair quantity forward at prices varying between 1s. 5d. and 2s. 9d. per dozen.

Butter.—Good supply of fresh butter from 1s. to 1s. 6d. per lb.; inferior quality from 9d. to 11d. per lb.; salt butter from 8d. to 1s. per lb.

Poultry.—Fowls, from 1s. to 2s. 6d each; ducks, from 4s. to 6s. 9d. per pair; geese, 8s. 9d.; turkeys, 6s. 6d. each.

Sundries.—The market abundantly supplied with the following. Fresh beef, 4d. to 6½d. per lb.; a quantity of inferior beef sold at 1d. per lb.; mutton from 7d. to 8½d. per lb.; pork, from 4d. to 7½d. lb.; pigeons, from 9d. to 1s. per pair; bacon 5d. to 7½d. per lb.; rabbits, 11d. to 1s. 4d. each; hares, 1s. 9d. each; tripe, trotters, suet, etc.

Vegetables.—Every morning sound, beautiful vegetables are offered in such abundance that it takes the salesmen hours to dispose of them; viz.:—Beans, beetroot, bringals, cabb ges, carrots, chillies, cucumbers, eschalots, herbs, lettuce, marrows, peas, radishes, rhubarb, tomatoes, etc., etc.

Fruit.—The most insatiable varieties, calculated to tempt the most fastidious epicure sold every day; consisting of apples, bananas, grapes, grenadillas, lemons, plums, pears, peaches, and pineapples.

Firewood.—Market abundantly supplied, and prices have ruled between 5d. and 6½d. for poles, and about 7½d. per 100lbs. for cut wood.

DURBAN.—Avocado pears, 1s to 2s 6d per dozen; apples (Colonial), 1s to 3s per case; bananas, 3d to 9d per bunch; bananas, 3d to 1s per 100; butter (fresh), 9d to 1s 3d per lb; cabbages, 6d to 1s 3d per dozen; ducks, 1s 10d to 3s 6d each; eggs (fresh), 1s 6d to 3s per dozen; fowls, 1s to 2s 11d each; granadillas, 9d to 1s per 100; papaws, 6d to 1s per dozen; pineapples, 6d to 1s 6d per dozen; potatoes (round), 4s to 8s per muid; plums (red), 2s to 5s per case; rhubarb, 1s 6d to 2s 6d per case; tomatoes, 1s to 3s 6d per case.—*Mercury*.

JOHANNESBURG.—Messrs. Abinger, Keeling & Co., P.O. Box, 564, on the 15th inst. reported:—

Mealies.—Very few have come forward during the week, and those few chiefly to the morning market where good prices have not been realised. Yellows have been much firmer, averaging 12s. 9d. on the market until to-day, when a fall took place to 11s. 9d. The uncertainty in prices has been chiefly due to quantities of mixed mealies from Basutoland being thrown on the market, which has kept buyers off in anticipation of lower prices; in view of the shortness of supplies available, however, the market should soon right itself.

Kafir Corn.—Remains unchanged, except that some parcels of old stock have been sold as low as 10s., which has slightly weakened sound grain.

Potatoes.—Prices continue to improve, 2s. 6d. to 12s.

Forage.—Good clean description in good demand, 5s. to 7s. 6d.

Lucerne, 5s. to 6s. 9d.

Live Stock.—Slaughter oxen, heavy, £11 10s. to £13 10s.; medium, £8 10s. to £10; trek, £7 to £8 10s.; sheep, heavy Capes, 22s. 6d. to 24s. 6d.; Merinos, 22s. to 24s. 6d.; lambs, 14s. to 17s.; pigs, 3d. 3½d. to 4½d., per lb. live.

Market still considerably overstocked with both sheep and cattle, although prices have improved slightly this week they are not likely to go any higher for sometime. Pigs in good demand.

Pound Notices.

The following cattle in the undermentioned Pounds will be sold on the 20th March next, unless previously released:—

Good Luck—Dark brown gelding, piece out of left ear, no brands, age about 5 years.

New Hanover—On the farm Cammel Hoek, black ox, white belly, tip off both ears.

Regina Farm—Gelding, light roan, aged, about 15 hands high, no brands. Black ewe goat.

Weenen—Three black ewe goats, long hair, two half moon nicks under right ear, Black and white ewe goat, swallow tail left ear. Black and white ewe goat, tip off left ear.

Good Hope—Fleabitten bay mare, chestnut foal at foot, branded C on off hind quarter, about 14.2 hands high. Fleabitten chestnut mare, branded C on off hind quarter, about 14.2 hands high.

Melmoth—Red and white ox, age about 8 years, no brands, ear marked in both ears. This animal has been running in Siteku's location during the last two months.

Greytown—Brown gelding, black points, no brands or ear marks visible, small star on forehead, and white mark on nose, about 14.5 hands high, and about 6 years old.

Bulwer—On the farm Highlands, Underberg, Black yearling heifer, no marks or brands.

Nqutu—Three kafir sheep, mixed colours, no brands.

Nkandhla—Kafir she goat, white, left ear slit.

To be sold on 13th March next:—

Charlestown—Sheep, ram, no brands. Probable value, £1. Impounded by G. W. Thomas.

To be sold 3rd April next:—

Mool River—On the farm Neikerksfontein, Red ox, 2 years old, nick in top side left ear, white patch on forehead, spot on right flank, no brands.

Agricultural Shows.

HIMEVILLE, Thursday, 16th May.—President : H. C. Gold. Hon. Secretary : Thos. E. Marriott, Brookedale, Polela.

BULWER, Wednesday, 22nd May.—All entries close 10th May. President : J. Isbister. Secretary : D. McK. Malcolm, Bulwer.

ROYAL AGRICULTURAL SOCIETY, 13th, 14th and 15th June.—All entries close 1st June. President : Sir G. M. Sutton. Secretaries : Messrs. Duff, Eadie & Co., 12, Timber Street, Maritzburg.

ESTCOURT, Wednesday, 19th June.—All entries close 8th June. President : A. F. Henderson. Secretary : E. Cantherley, Southdowns, Estcourt.

HARDING, Thursday, 20th June.—All entries close 6th June. President : A. G. Prentice, J.P. Secretary : Thos. Tribe, Harding.

DUNDEE, Thursday, 27th June.—All entries close 12th June. President : F. Turton. Secretary : J. McKenzie, Dundee.

HOWICK, Thursday, 27th June.—All entries close 12th June. President : Graham Hutchinson. Hon. Secretary : Arthur F. Dick, Howick.

NEWCASTLE, Friday, 28th June.—All entries close 18th June. President : F. A. R. Johnstone, M.L.A. Secretary : Wm. Beardall, Newcastle.

LADYSMITH, Friday, 5th July.—All entries close 30th June. President : Herman Illing. Secretary : E. Scott, Box 90, Ladysmith.

UMZINTO, Thursday, 11th July.—All entries close 9th July. President : W. Thomson. Secretary : George Lamb, Umzinto.

DURBAN, 18th, 19th and 20th July.—President : W. R. Poynton. Secretary : Frank J. Volak, New Germany.

RICHMOND, Thursday, 25th July.—All entries close 12th July. President : John Marwick. Hon. Secretary : T. McCrystal, Box 32 Richmond.

DATES NOT FIXED.

GREYTOWN (Date not fixed).—President : Major T. Menne. Secretary : W. H. Gibbs, Greytown.

MID ILLOVO (Date not fixed).—President : B. B. Evans. Secretary : C. B. Lowe, Mid Illovo.

NEW HANOVER (No Show on account of E. C. F.).—President : R. H. Oellermann. Secretary : W. D. Stewart, New Hanover.

NOODSBERG ROAD (Date not fixed).—President : Fritz. Reiche, J.P. Secretary : Paul Vietzen, P.O. Singletree.

STANGER (Date not fixed).—President : F. Addison. Secretary : H. C. Smith.

OTHER SHOWS.

PIETERMARITZBURG HORTICULTURAL SOCIETY, 17th October.—President : T. R. Sim, F.L.S. Hon. Secretary : S. Colman, Deeds Office, Maritzburg.

Writing on the subject of cattle droving in Australia, a contributor to the *Queenslander* says :—After you have been a couple of days or more on a dry stage of your journey with cattle and eventually reach water and the beasts get a drink, you discover their condition ; the strong and healthy draw off to graze, and the sick, lame, and weary lie down. Then the drovers ride through the cattle, and taking a good look at them make mental calculation as to the chances of the sick and lame reaching the end of the next stage. If an animal knocks up on the way, the only thing to do is to shoot it where it lies and take its brand (i.e., cut out the piece of hide that bears the brand), leaving the carcase for the wild dogs, hawks, and crows. The drovers are paid so much per head for the cattle they convey, and the payment for beasts it has been necessary to destroy on the way is made according to the distance they travelled.

Executives of Farmers' Associations.

ALFRED COUNTY FARMERS' ASSOCIATION.—President: A. G. Prentice, J.P. Vice-Presidents: C. Knox, J.P., L. T. Trenor. Committee: C. M. Etheridge, E. J. Gray, W. B. Rethman, H. W. F. Rethman, C. A. Howell, R. E. H. Fann, J.P., W. T. J. Gold, Dr. Case, Revd. S. Aitchison. Hon. Treasurer: H. C. Hitchins. Secretary: T. Tribe.

BOSTON FARMERS' ASSOCIATION.—President: Thomas Fleming. Vice-President: J. Geldert. Hon. Secretary and Treasurer, W. J. Fly.

CAMPERDOWN AGRICULTURAL SOCIETY.—President: John Moon, C.O.; Vice-Presidents: A. N. Kirkman, J.P., and G. Swales; Hon. Secretary: — Wilson.

CAMPERDOWN AND DISTRICT FARMERS' ASSOCIATION.—President: John Moon. Vice-President: F. N. Meyer. Hon. Sec.: L. Baker.

DUNDEE AGRICULTURAL SOCIETY.—President: F. Turton, Esq., J.P. Vice-Presidents: The Minister of Agriculture, the Mayor of Dundee, Messrs. A. L. Jansea, H. Ryley, and W. Craighead Smith, J.P. Hon. Secretary and Treasurer: J. McKenzie. Committee: D. C. Pieters, D. Macphail, W. H. Tatham, H. Baasch, M. Taylor, J. A. Landman, N. F. Hesom, A. W. Smallie, C. W. Whysall, W. Craig, C. G. Willson, T. P. Smith, J. Campbell, J. B. Duboise, W. R. Quedstedt, A. Grice, D. Meumann, W. J. H. Muller, J. E. Caldwell, E. C. Saville, C. M. Meyer, A. J. Oldacre.

DURBAN COUNTY FARMERS' ASSOCIATION.—Patron: J. H. Colenbrander. President: J. McIntosh. Vice-Presidents: H. Westermeyer, R. R. McDonald. Committee: F. R. W. Boehmer, G. Compton, H. Freese, W. Freese, W. Gillitt, H. W. Königsrämmer, H. W. Nichols, F. Schäfermann. Hon. Sec. and Treasurer: Frank J. Volek.

HATTING SPRUIT FARMERS' ASSOCIATION.—President: Wm. Craig. Vice-President, J. Campbell; Committee: J. J. S. Maritz, G. De Waal, H. J. Hearn, Thos. Brookes, N. Glutz, H. Glutz, W. A. Quedstedt, J. A. Brookes, W. J. Hislop, Thos. Dewar, J. Humphries, W. H. Tatham, A. E. Norman, D. W. H. Tandy; Hon. Secretary and Treasurer: R. J. Hearn.

HIMEVILLE AGRICULTURAL SOCIETY.—President: Henry C. Gold, Dartford, Polela. Vice-Presidents: W. Little, R. Justice, G. Malcolm. Executive Committee: G. Malcolm, W. S. Johnston, P. McKenzie, W. Little, G. Royston. Hon. Secretary and Treasurer: Thos. E. Marriott, Brookdale, Polela. Assistant Secretary: F. W. Fell, Ericksburg, Polela.

HOWICK FARMERS' ASSOCIATION.—Chairman, Thos. Morton; Vice-Chairman, M. A. Sutton; Hon. Secretary and Treasurer, A. Clark.

INGOGO FARMERS ASSOCIATION.—President: Angus Wood, J.P. Vice-Presidents: G. A. Finstone and J. Browning. Hon. Secretary and Treasurer: C. Watt.

IXOPO AGRICULTURAL SOCIETY.—President: W. Arnott. Vice-Presidents: F. L. Thring, J.P., John Anderson, C. E. Hancock, J.P. Committee: W. K. Anderson, J.P., Thos. Allen, J. C. Auld, H. D. Archibald, F. S. Benningfield, S. Boyd, F. E. Foxon, R.M., Wm. Foster, Jas. T. Foster, Geo. E. Francis, L. Gray, A. M. Greer, J.P., J. B. Greer, Wm. Gold, Jno. Gold, H. A. Hill, C. F. Harries, A. E. Keith, R. Kennedy, Geo. Martin, W. Oakes, L. J. Phipps, T. F. Remfry, J. W. Robinson, Jas. Schofield, M.L.A., A. Stone, W. R. Way, G. C. Way, A. H. Walker, M.L.A., J. L. Webb (F.R.C.V.S.). Hon. Sec: R. Vause. Hon. Ass. Sec.: C. K. D. Beales. Hon. Treasurer: T. Arnott.

IXOPO FARMERS' ASSOCIATION.—President: A. E. L. Keith, Ixopo. Vice-Presidents: Geo. Martin, Claybrooke, Ixopo; A. Kirkman, Lufafa, Ixopo. Hon. Secretary and Treasurer: Geo. E. Francis, Morningview Ixopo. Delegates to Farmers' Union: President and James Foster. Committee: F. Remfry, R. Vause, C. E. Hancock, John Anderson, R. Greer, W. Oakes, D. Campbell, G. C. Way, James Foster.

KLIP RIVER AGRICULTURAL SOCIETY.—President: Herman Illing; Vice-Presidents: J. T. Francis, J. G. Bester, W. Pepworth. Auditor: J. T. Francis. Esq. Secretary: E. Scott, F.I.A. (Lond.). Executive Committee: A. Brink, D. Bester, J. Farquhar, C.M.G., W. C. Hattingh, J. G. Hyde, Trev. Hyde, A. L. Horsley, W. Freer, L. A. Leonard, H. Nicholson, J. H. Newton, J. T. Sandalls, W. H. Roberts, H. C. Thornhill.

LION'S RIVER DIVISION AGRICULTURAL SOCIETY.—President: Graham Hutchinson; Vice-President: H. Nisbet; Executive Committee: H. Nisbet, M. A. Sutton, A. J. Holmes, J. Humphries, Jno. Pole, and W. A. Lawton; Auditor: W. J. R. Harvard; Hon. Sec. and Treasurer: Arthur F. Dicks, P.O. Box 1, Howick.

LOWER TUGELA DIVISION ASSOCIATION.—President: T. G. Colne, brander. Vice-President: Lieut.-Col. F. Addison. Hon. Secretary and Treasurer: H. Curtis Smith. Committee: A. S. L. Hulett, A. E. Foss, G. Stewart, J. B. Hulett.

MID-ILLOVO FARMERS' CLUB.—Chairman: L. G. Wingfield-Stratford, J.P. Vice-Chairman: B. B. Evans. Hon. Secretary: J. W. V. Montgomery. Assistant Hon. Secretary: R. Norris Jones. Hon. Treasurer: Jos. McCullough.

MOOI RIVER FARMERS' ASSOCIATION.—President: C. B. Lloyd; Vice-President:—R. Garland; Hon. Treasurer: H. A. Rohde; Collector: Capt. W. H. Stevenson; Auditor: Claude Scott; Hon. Secretary: E. Catherley.

MUDEN AGRICULTURAL ASSOCIATION.—President: Thos. Thresh. Vice-Presidents: Wm. Lilje, E. A. Grantham. Secretary and Treasurer, C. A. Selling. Committee: Otto Rottcher, Karl Lilje, Karl Rotter, Herman Schafer, Fritz Torlage, T. Braithwaite, Ernest Rottcher, C. H. Tilbrook, Rev. H. Rottcher (Hon. Life Member).

NEWCASTLE.—President: F. A. R. Johnstone, J.P. Vice-President: C. Earl, J.P., Mayor of Newcastle; Angus Wood, J.P., Ingogo; O. Schwikkard, C.M.G., Newcastle. Secretary: Wm. Beardall. Treasurer: Ed. Nicols. Executive Committee: L. H. S. Jones, E. Phillips, H. C. Caldecott, C. Watson, G. Langley, W. A. Lang, W. J. P. Adendorff, J. E. de Wet, O. Davis, S. W. Reynolds, B. Pettigrew, G. W. Thomas, G. H. Bishop, H. R. Muir, M. C. Adendorff, W. Napier, P. Van Breda, Chriss Botha, G. Templer.

NEW HANOVER AGRICULTURAL ASSOCIATION.—President: R. H. Oellermann. Vice-Presidents: J. C. Watt, J.P., and J. A. Westbrook. Life Member: C. A. S. Yonge, M.L.A. Secretary and Treasurer: W. D. Stewart, New Hanover. Auditor: J. H. F. Hohls. Committee: W. N. Angus, E. Bentley, W. W. Bentley, Edward Boast, H. W. Boast, E. E. Comins, G. R. Comins, C. Crookes, jun., G. Demont, H. Dinklemann, J. Duval, W. Fortmann, Dr. C. H. Herbert, J. Hillermann, J. H. F. Hohls, H. Jacobson, H. A. Light, G. C. Mackenzie, A. F. Mackenzie, T. M. Mackenzie, J. Muirhead, J.P., G. Moe, J. Moe, O. Moe, C. Oellermann, F. Oellermann, R. H. Oellermann, J. C. Otto, H. Oellermann, E. Peckham, J.P., J. A. Potterill, S. Peckham, C. M. Scott, Rev. J. Scott, Wm. Schroder, J.P., Owen Solomon, J. H. Smith, Riby Smith, H. Thöle, F. Thöle, H. Vorwerk, H. F. Westbrook, W. H. Westbrook, C. Westbrook, T. Wolhuter.

NOODSBERG ROAD AGRICULTURAL ASSOCIATION.—President: Fritz Reiche, J.P.; Vice-Presidents: H. Mummbrauer, P. Rodehorst, W. Dralle, W. Wortmann; Committee: W. Bartels, F. Bosse, H. Brammer, A. J. Bruyns, H. Bruyns, Carl Dralle, H. Gebers, W. Gevers, J. H. Holley, jr, W. C. Holley, C. Hillermann, L. Koch, H. Köhler, F. E. Kuhn, M. Maister, H. Merens, A. Meyer, H. Meyer-Estorf, H. W. Meyer, K. A. Meyer, H. Misselhorn, W. Misselhorn, K. Peters, I. Pfothenhauer, G. Rabe, G. Reiche, Joh. Reiche, W. Rencken, H. Rosenbrock, H. Schmidt, K. Schmidt, Rev. Jas. Scott, K. Seele, F. J. Smith, J. Thies, W. Witthöft, P. Wortmann, A. Wortmann, F. Wortmann, H. Wortmann; Secretary: Paul Vietzen, P.O. Singletree; Hon. Treasurer: E. Beurlen.

NOTTINGHAM ROAD FARMERS' ASSOCIATION.—President: W. Henwood, J.P., Vice-President: B. Greene; Auditor: A. Mengens; Secretary and Treasurer: C. J. King, Nottingham Road.

RICHMONT AGRICULTURAL SOCIETY—President: John Marwick. Vice-Presidents: W. P. Payn, A. W. Cooper, J. W. McKenzie and Chas. Nicholson. Honorary Treasurer: R. Nicholson. Hon. Secretary: Tom M'Crystal. Committee: J. W. T. Marwick, Evan Harries, R. A. McKenzie, F. O. Howes, H. M. Moyes, W. Comrie, Thos. Marwick, J. C. Nicholson, J. W. Flett and E. J. B. Hosking.

ROYAL AGRICULTURAL SOCIETY OF NATAL.—President: Sir G. M. Sutton, K.C.M.G. Vice-Presidents: His Worship the Mayor, Messrs. Jas. King, O. Hosking, D. C. Dick, Col. E. M. Greene and P. D. Simmons. Executive: Sir G. M. Sutton, President; Messrs. Jas. King, O. Hosking, D. C. Dick, Col. E. M. Greene and P. D. Simmons, Vice-Presidents; Committee: G. J. Macfarlane, W. S. Grant, W. H. Cobley, H. J. Stirton, W. J. O'Brien, L. Line and Sir T. K. Murray. Yard Superintendent: H. J. Stirton. Secretaries, Treasurers and Collectors: Duff, Eadie & Co., 12, Timber Street, Pietermaritzburg. Auditor: G. V. Lambert.

SLANG RIVER (UTRECHT) FARMERS' ASSOCIATION.—Chairman, P. J. Kemp; Executive Committee: J. J. Uys, J. Z. Moolman, T. J. Botha, P. J. Viljoen, P. J. Kemp; Hon. Sec. and Treasurer, Thys Uys, Utrecht P.O.

UMVOTI AGRICULTURAL SOCIETY.—President: Major T. Menne. Vice-Presidents: Thounis J. Nel, M.L.A., W. J. Slatter, W. L'Estrange. Executive Committee: Tol Nel, A. Newmarch, W. Lilje, O. Rotteher, S. C. Van Rooyen, W. Newmarch, E. J. Van Rooyen, O. Norton, I. M. Nel, J. Browning. Managers of Show Yard: J. M. Handley and N. Hunter. Hon. Auditor: W. K. Ente. Secretary and Treasurer: W. H. Gibbs.

UPPER BIGGABERG FARMERS' ASSOCIATION.—President: George Langley; Vice-President: W. L. Oldacre; Secretary: J. H. Murray.

UTRECHT AGRICULTURAL SOCIETY.—Chairman: L. Viljoen; Vice-Chairman: B. H. Breytenbach; Members: I. Bierman, M. M. Knight, J. H. Kloppe, B. C. Hattingh, T. Botha, M. Gregory, P. L. Oys, H. P. Breytenbach, Secretary: G. J. Shawe.

VICTORIA COUNTY AGRICULTURAL SOCIETY.—President: Lieut.-Colonel F. Addison; Vice-Presidents: Sir Liege Hulett, Kt., M.L.A., W. J. Thompson, Esq., J.P., J. Polkinghorne, Esq., M.L.A.; Committee: Messrs. W. H. B. Addison, G. S. Armstrong, M.L.A., C. Bishop, J.P., D. Brown, sen., J.P., W. Campbell, T. G. Colenbrander, A. E. Foss, J.P., A. S. L. Hulett, J.P., J. B. Hulett, C. Jackson, G. Nicholson, J.P., T. Polkinghorne, J. W. Perkins, J.P., E. Saunders, J.P., G. Stewart, and J. H. Stansell; Hon. Secretary and Treasurer: H. Curtis Smith (Stanger).

WEENEN AGRICULTURAL SOCIETY.—President: A. F. Henderson, Esq., C.M.G.; Vice-Presidents: J. Button, J.P., Jas. Ralfe, J.P., H. Blaker, J.P., E. B. Griffin, J.P.; Hon. Treasurer: F. C. Schiever; Auditor: S. Wolff; Executive, Hon. H. D. Winter, R. H. Ralfe, J. W. Moor, D. W. Mackay and Allan Stuart; Manager of Show Yard: S. Vaughan; Assistant: A. Clouston; Hon. Secretary: E. Cautherley.

WEENEN COUNTY HORTICULTURAL SOCIETY.—Committee of Management: A. F. Henderson, C.M.G., F. C. Schiever, G. W. Linfoot, P. J. Nunn, Dr. Brewitt, S. Vaughan; Hon. Secretary: E. Cautherley.

ZULULAND COAST FARMERS' ASSOCIATION.—President: G. H. Hulett; Vice-President: C. Hill; Hon. Secretary and Treasurer: F. Braumage Ginginhlovu.

(The Editor will be obliged if the Hon. Secretaries will supply him with lists of the Executives of their Associations.)

Central Experiment Farm, Cedara.

IN order to minimise interference with the general course of work on the Central Experiment Farm, Cedara, it has been found necessary to set apart two days of the week, namely, Tuesdays and Fridays, as visitors' days.

Arrangements will accordingly be made on those days for receiving visitors and showing them round the Farm. A trap will be at Cedara Station to meet the up 9.50 a.m. train; and if intending visitors from up-country will give notice to the guard at Howick Station, on their way down, a trap will be sent to meet the train which passes through Cedara at 11.2 a.m. Visitors travelling by other trains will also be met if they will previously make arrangements by writing.

On other than visitors' days visitors may be received by appointment, but special attention cannot be guaranteed in regard to their being shown round.

At least fourteen days' clear notice must be given by associations so that there may be time to make all necessary arrangements.

W. F. CLAYTON,

Minister of Agriculture.

Pigs for Johannesburg.

THE Minister of Agriculture is advised that the quarantine restrictions which were recently imposed on the Witwatersrand district, on account of an outbreak of Swine Fever, are about to be removed.

Diamond Drilling.

SOME of the departmental diamond drilling plants are at present disengaged and available for hire for boring for either minerals or water. Particulars as to terms of hire may be obtained from the undersigned.

CHAS. J. GRAY,
Commissioner of Mines.

Model Rules for Agricultural Co-Operative Societies.

THE Department of Agriculture has for disposal, at the rate of one shilling each, copies of Model Rules for the use of Agricultural Co-operative Societies. Applications should be made to the Secretary, Minister of Agriculture, Pietermaritzburg.

Employment Bureau.

THE Department of Agriculture has received applications from the undermentioned, who are prepared to become assistants or apprentices on farms. The Department will be glad to hear from farmers willing to take young men as assistants, and to place them in correspondence with the various applicants. When communicating on the subject, farmers may refer to the applicants by quoting the numbers in the following list:—

No. 90.—22 years of age, active and not afraid of work, desires situation on farm where he can acquire knowledge of farming, small remuneration with board and lodging required.

No. 91a.—Scotchman, 40 years of age, single, who has had lifelong experience of stock and agricultural farming in Scotland. Has been three years in South Africa. Produces good references. Is of respectable and intelligent appearance. Seeks managership or assistant managership of farm, if possible. Salary not of first importance.

No. 92a.—Englishman, 50 years of age, with varied experience in tea and coffee planting in Ceylon, and also of contract work. Has also been on a Sugar Estate, and has had experience in pig rearing. Salary needed.

No. 93.—Young lady, 20 years of age, trained at the Reading Agricultural College and holding certificates for Poultry and Dairying, desires situation on a farm. Is prepared to take entire charge of poultry and dairy and, if required, would accept payment on results. Stated to be keen worker and thoroughly practical.

No. 94.—Scotchman, who has lived all his life in South Africa, desires employment on farm in connection with stock if possible. Was a Head Conductor during Boer War. Was 2 years with Transvaal P.W.D. as handyman. Produces good references. Desires salary.

Trees for Sale.

To encourage tree-planting, transplants and seeds of forest trees are supplied by Government, so far as in stock, at the undermentioned rates, exclusive of carriage, from the Government Nursery, Central Experimental Farm, Oedara.

Transplants of Eucalyptus, Pines, Acacias, Casuarinas, Cupressus, etc., about 25 trees in each tin, at 8s. 4d. per 100 trees. Trees in separate tins at 1s. each.

Transplants of scarce kinds, larger trees, or surplus stock, when available, will be charged at special rates, which will be furnished on application.

Tree seeds, in variety, at 1s. per packet. Price per pound, which fluctuates, will be furnished on application.

Package and postage of seed, when required, charged 1s. per lb. extra.

Orders for present or spring delivery should be addressed to the **Forester, Oedara**, and must be accompanied by a remittance in cash or postal order. Cheques cannot be accepted.

T. R. SIM,
Conservator of Forests.

Bulletins Issued by the Department of Agriculture.

Single copies may be obtained free (excepting those with price attached) on application to the Secretary, Minister of Agriculture.
No.

- 1.—“Notes on Fruit Culture,” by Claude Fuller. [1902]. (*Out of print*).
- 2.—“Manures on the Natal Market, 1902,” by A. Pardy. [1902].
- 3.—“Insects in an Important Role,” by Claude Fuller. [1904]. (*Out of Print*).
- 4.—“Manures on the Natal Market, 1903,” by A. Pardy. [1903].
- 5.—“Weed Circular,” by Claude Fuller. [1905].
- 6.—“Manures on the Natal Market, 1904,” by A. Pardy. [1904].
- 7.—“Tree-planting in Natal,” by T. R. Sim. [1905]. (*Price 2s. 6d.*)
- 8.—“Agricultural Co-operation,” by E. T. Mullens. [1905].
- 9.—“Potato Culture” by A. N. Pearson. [1905].
- 10.—“Manures on Natal Market, 1905,” by A. Pardy. [1905].
 “*Agricultural Statistics, Natal, 1904-5.*” [1906].
- 11.—“East Coast Fever,” by S. B. Woollatt. [1906].
- 12.—“Manures on Natal Market, 1906,” by A. Pardy. [1906].

Natal Agricultural Journal and Mining Record.

Bowel Lesions In the Horse due to a Strongylus.

A. J. BECKETT, M.R.C.V.S.

DURING the past month several fatal cases of Enteritis (inflammation of the bowel), due to this parasite, have come under my notice. As the worm is minute it may easily be overlooked on casual examination, and death consequently attributed to other agents, such as "Bots," which have nothing whatever to do with the disease in question. Bots, in my experience, rarely, if ever, produce serious lesions, and are present in practically every horse that has been exposed to the attack of the fly (*Gastrophilus Equi*.) As, however, they are readily recognised, careless observers give them credit for many morbid conditions. A few notes calling the attention of horse and mule owners to this disease may therefore not be out of place.

The parasite worm in question is a small thread-like body, varying in length in the *Strongylus Armatus* between $\frac{1}{2}$ inch and $\frac{3}{4}$ inch, and in the *Tetracanthus* from 1-3rd inch to $\frac{1}{2}$ inch. The colour varies slightly, but is generally of a greyish-brown, and may be tinged with red. These worms are usually found in the large bowel, and when present are frequently in immense numbers. Over 1,000 have been counted by Chaubert on a bowel surface of two inches, and it was estimated that this horse contained 1,000,000.

The parasite does not appear to be confined to any particular country or climate, being found throughout the Continent of Europe and in the British Isles. Unless carefully looked for, the worms will not be discovered on *post-mortem* examination, but when present in any number they may be readily recognised as small thread-like bodies adhering to the inner coat of the bowel. They may also be seen, if detached, lying

on the bowel contents, and movement there can generally be detected. A careful examination will often reveal small tumours in the bowel wall; these are caused by the encysted parasite at one stage of its existence. The arteries supplying blood to the bowel (mesenteric) may also be affected at certain stages, and tumours may be formed in their walls by the parasites, causing blood clot and partial or complete plugging, and as a consequence interference with the local blood supply and bowel nutrition.

If a portion of the intestine containing these worms be excised, rinsed, and held up to the light, numbers of the parasites will be seen adhering to the inner surface. The bowel itself will usually show small, red, puncture-like marks. These are due to the irritation produced by the hooked head of the parasite, by means of which it maintains its position.

If advanced inflammation is present the bowel will be partially or wholly of a deep red colour, and may be much increased in thickness owing to inflammatory exudate thrown out between its coats (outer and inner surfaces). A careful search may show the bowel arteries affected in the manner before described. In one case that has recently come under my notice severe Enteritis was seen, and there were several perforations from rupture of the tumours in the intestinal walls. As a consequence "Peritonitis" (inflammation of the covering of the abdominal walls) was present. This in cases of the kind is a possible sequel, but as a rule uncomplicated Enteritis is the symptom noted on examination after death.

The symptoms during life are vague, and are not, so far as I can learn, of a characteristic nature. Debility, colic symptoms, and in some instances chronic bowel derangement, with a tendency to diarrhoea, may be observed. On the other hand, in recent cases coming under my notice all these symptoms were absent, and the animals were in good condition, showing no signs of bowel trouble until enteric symptoms set in.

When colic or enteritis has appeared, no distinguishing feature can be named which will differentiate these cases from simple colic or enteritis.

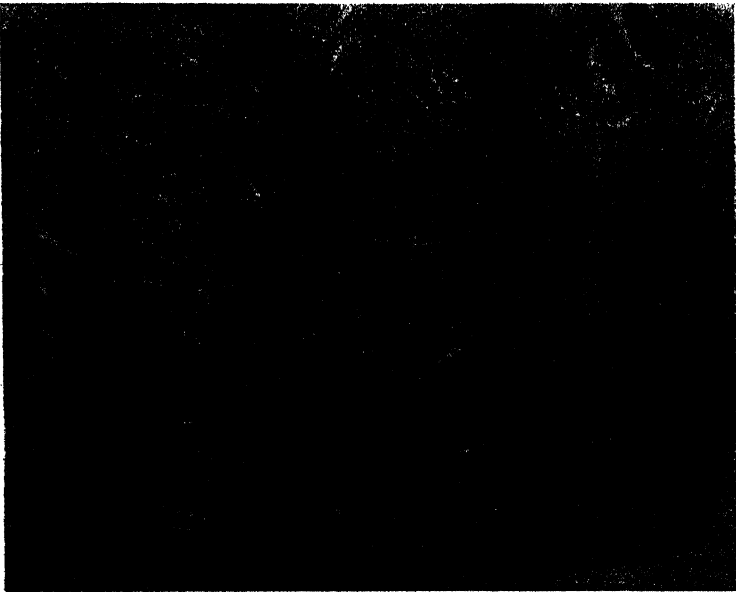
At times a positive diagnosis may be obtained by manual exploration of the rectum, as the worms may possibly be found adhering to the arm or on the dung removed. This, however, is anything but an infallible test, and should not be relied on if it prove negative. It therefore frequently happens that no positive diagnosis can be made unless death occurs and a *post-mortem* examination offers.

It will not be necessary to emphasize the usefulness of a *post-mortem* examination in these cases, it should at once call attention to the fact of the parasite's presence on a farm or locality, thus enabling an owner to take proper precautions to avoid further loss. Should a similar case occur later, information has been gained which will prove of the utmost

value in treatment; and more important still, it affords an opportunity of immediate preventive treatment amongst other animals which have been exposed to the same chances of contagion.

It is most essential after making a *post-mortem* examination that the ground be thoroughly disinfected, and a strong disinfectant should be freely used over the entrails and bowel contents before burning or burying them. Precautions of this kind are necessary to check the spread of all parasite diseases, as the eggs if not destroyed will be the means of a fresh outbreak.

It seems probable that water and green forage are the usual vehicle of contagion in this particular instance, therefore any trouble taken to avoid this contamination will be amply repaid.



SCLEROSTOMES ON PIECE OF BOWEL.

(After Railliet.)

As regards treatment, if a correct diagnosis can be made rational treatment may be carried out with hope of success, provided marked inflammatory symptoms are absent.

Enteritis, when once established, is a very serious lesion in the horse, and often proves rapidly fatal.

If, however, an animal is taken in an early stage, before bowel inflammation has made its appearance, a regular course of worm medicine is indicated, and should be persisted in for a considerable time, at short intervals, and followed by a dose of oil or physic. Violent remedies, or irritant medicines, are counter-indicated, owing to the irritable state of the intestinal mucous membrane, which is not in a condition to bear

drastic measures. The object in view, to kill and expel the worms, and in doing so to avoid anything likely to produce or increase bowel irritation or inflammation, must be borne in mind if success in treatment is looked for.

It will be observed that stress is laid on prevention. As a matter of fact preventive measures promise most success, and their importance cannot be overestimated once this parasite has been proved to exist in a troop or on a farm. Any inattention to this detail may result in a serious outbreak and heavy loss.

As an animal harbouring parasites of this nature is simply a breeding ground from which they disseminate, the infection of others in contact follows as a natural course, provided that the conditions are favourable to parasite life and growth.

It is not intended to convey the idea that all horses harbouring these parasites will necessarily suffer from serious bowel derangement, but their presence cannot be beneficial, and if in numbers must be a constant menace to health. The natural healthy tone and function of the bowel must be more or less interfered with, and as a consequence its vitality lowered, and predisposition to intestinal disease increased.

The attached illustration, taken from "Neumann's Parasites," will convey some idea of the actual parasite on the bowel surface as generally seen in the fully developed stage. The asexual or immature parasite is more minute and requires careful observation to localise.

Short Notes.

FOURCROYA GIGANTEA.—There are a good many plants of *Fourcroya gigantea*, the commercial aloe of Mauritius, to be found in and about Maritzburg, but they are often unrecognised even by the owners of the land on which they are growing. There is a particular plant in a position easily accessible to all; namely, close to and almost touching the nearest bridge to the Botanical Gardens from the tramway terminus. The bridge is of the "rustic" order.

CHEAP LABOUR.—Not for many years has native labour been so abundant in the Colony. In the towns and in the country boys are constantly asking for work. In Durban there are many hundreds of time-expired Indians wanting work; according to law, no one may employ these Indians if they are not in possession of receipts for their annual £3 license. Many of these time-expired Indians do not hold such receipts, and they do not easily find employers speculative enough to advance the arrears. In Maritzburg and probably Durban the shrinkage of natives in employment is a trouble to the butchers; butchers depend largely upon natives as purchasers of the inferior meat belonging to every carcass.

LUCERNE.—Lucerne growers in America state that in a dry spell, just after the lucerne has been cut and stooked, it pays well to disc the land both ways, then harrow smooth. In this way they have increased the yield by 25 and 54 per cent. This applies to alfalfa three or more years old. Some, however, have disced it when only two years old, and report good results. They use a sharp level harrow at this stage of its development. In a thin stand the disc may be set at a sharp angle, with a thick stand at a less angle. Set the discs to a good depth, so as to cut through the crust formed and turn the soil well over. Besides thickening the stand of alfalfa, hastening its growth, and conserving the moisture, much good will be done by eradicating weeds. For best results, and to make it easier for the team, the discs should be sharp. Repeat the discing after each successive cutting.

SWING-PLOUGHS.—In his "interview" with Mr. Wm. Taylor, Ergates referred to a swing-plough which Mr. Taylor brought to the Colony many years ago. The following extract from a report of the American Consul at Edinburgh will be read with interest:—"It is curious to note a tendency among farmers in certain sections to go back to the old Scotch 'swing' plough. A prominent dealer in agricultural implements states that many ploughmen take pride in their expertness, and, as 'anybody can manage a beam which runs on a wheel,' they have a fancy for the old and more difficult type of plough. This probably explains the occasional calls for these out-of-date implements." If the Colony should ever possess a museum of agricultural implements and appliances, it is to be hoped that the ancient plough belonging to Mr. Taylor—the kind of plough which Robert Burns worked with—will be found among the exhibits.

THE RAINFALL.—A glance at the meteorological returns will show an immense improvement in the rainfall for the present year compared with that of last year. When the year—the weather year—ends, the improvement is bound to be even more striking. Some of the returns now published arrest attention. Branholme, close to the Karkloof forest district, shows over 50 inches in the eight months, and that dry corner of the Colony—Weenen—shows the respectable rainfall of over 19 inches for the same period. Heavy storms are characteristic of the year; several stations record over 2 inches fall in a day, and at Mid-Illovo and Equeefa nearly 4 inches fell on the 4th of February. Umzinto lays claim to a rainfall of over 6 inches in one day. Downpours of this class are rarely received with gratitude; if they fall on hill-sides under cultivation they wash away tons of the best soil, including the costly fertilisers put into it. At the mouths of the rivers along the Coast a final sight of the spoil may be seen; the waves, including the crests, foam, spume and the rest are the colour of the rich mud of which they are largely composed. Sugar-growers are delighted with the weather, and predict a bumper crop for next year.

BAGS FOR MEALIES.—In view of the large exports of mealies expected to take place this season, the Department of Agriculture has been making enquiries concerning the cost of grain bags. Bags of 2½lbs. answer the purpose well, and 2½lb. bags are only occasionally used. The present prices of bags are:—2½lb. bags, 6½d. each, less 5 per cent.; 2½lb. bags, 7d. each, less 5 per cent. To make provision for the expected mealie export-trade, there is every probability of larger importations of bags than for last year. January and February orders are said to be much in excess of late seasons.

MR. J. MEDLEY WOOD, A.L.S.—Mr. Medley Wood, Director Durban Botanic Gardens, on the 1st of this month completed his twenty-fifth year as chief of that scientific and popular institution. The Gardens when he took them in hand could botanically boast of little more than their name. That defect was soon remedied, and now, for their size, the Gardens compare well with any in the world. And all, be it noted, has been accomplished with a most niggardly revenue. Besides the methodical classification of everything growing, Mr. Medley Wood recently established a “dry garden” or herbarium, which already contains many thousands of specimens of plants South African and foreign. His Work, “Natal Plants,” is one of great research, and of which he may well be proud. Mr. Medley Wood, as very many can testify, is always ready to give all information about every plant that may be sent to him for identification. His cheery nature—he is now in his 80th year—and his readiness to put his great botanic knowledge at the disposal of all genuine enquirers are known far and wide. May his distinguished and useful career continue for many years to come!

RAMIE.—Mr. J. Medley Wood, A.L.S., in the *Witness* of the 11th inst., sounds a note of warning to those who may be inclined to plunge with over-zeal into a Ramie-growing business. In the *Journal*, from the very first, while republishing unstintedly the glowing panegyrics periodically being given to the public on this undeniably splendid fibre, we have also from time to time pointed out some of the more obvious inconsistencies as regards the alleged profits to the growers. Mr. Medley Wood says that if the machine referred to by Mr. W. J. Bell in his article on Ramie in the last issue of the *Journal* will do what is claimed for it the future of Ramie is assured. As will be seen, all hangs on the word “if.” The description of what this machine can do is taken by Mr. Bell from the *South American Journal*. What that publication says the machine can perform sounds marvellous; in one day it will produce a ton of what is selling in London from £30 to £40 per ton—and of better quality, from a material that one of the chief apostles of the industry (Mr. Radcliffe) asserts can be grown with Asiatic labour for \$7 or \$8 per ton. All, we repeat, depends on the word “if.” The Indian Govern-

ment have offered on more than one occasion prizes of £5,000 for the invention of such a machine. It is said that inventors—British, French, German, and American—have expended hundreds of thousands in money for the production of such a machine. If the qualities are as stated, confirmation from India, China, Egypt, etc., may be soon be expected. In the meantime the hope may be expressed that writers on Ramie will be more specific in their terminology; reference to ribbons, filasse, fibre, China-grass, etc., as one and the same, also decortication and degumming, accounts for infinite confusion when considering the question of profits.

A RAILWAY MATTER.—A correspondent asks for information on a subject which was dealt with in a "Short Note" three years ago. The Note was as follows:—One of the most irritating annoyances in connection with the administration of country railway stations has been the omission to notify consignees by post of the arrival of goods. In Durban and Maritzburg, consignments are delivered, but in the country the consignee only learns of the arrival of what is sent to his station by the personal courtesy of the stationmaster, by chance, or by continuous enquiry. It is strange that such absence of method should have existed so long, and should have been endured with patience. When the post offices receive a parcel the consignee is informed of the arrival by a notification immediately posted to him. People living in the country will be glad to know that in future the railway will act on similar lines. In recently issued Instructions to the Railway Staff, Clause 8 (Goods to be advised) directs that:—"in future an advice must be sent through the post by all Stationmasters to all consignees, advising the arrival of their goods." This should prove a great boon; there should be no necessity in future for people to send messengers with notes asking if expected goods have arrived, or even worse still, sending a wagon after having given a reasonable time for delivery, to discover only that the goods have not reached their railway destination. In the future, it may therefore be understood, that if a country consignee does not receive prompt official notice of the arrival of his goods, there has been a dereliction of duty; if the dereliction is not satisfactorily explained by the official concerned, it should be promptly reported to the headquarters. Such reporting, however, is a disagreeable business for people, and is apt to be shirked. If the inspecting officers—particularly for the first few months—would carefully compare the counterfoils of the advice-book with the arrival of goods at the stations, a fairly effective check against negligence would be established. Consignees, however, must be prepared to help themselves, the boon—and a great boon it is—has been granted by the railway management, and if the system is not soon working with the automatic ease and regularity of the Postal Department in the matter of parcels, the fault will largely be with the people themselves.

Fibre Cultivation.

SISAL AGAVE, *FOURCROYA GIGANTEA*, AND RAMIE.

By CESAR ROSITZKY, Port Shepstone.

IN consequence of the many inquiries received lately relative to the cultivation and preparation of fibre, at the request of the Department of Agriculture I am embodying the results of my studies, experiments, and experiences, in the form of an article for this *Journal*.

Most of my information in the first place I received from books and periodical literature, and by correspondence with various planters and others interested in fibre. Later on I visited plantations in German East Africa where fibre-growing is now an established industry.

AGAVE SISALANA.

The Sisal agave is grown principally in Yucatan, from the port of which—Sisal, where most of the fibre is shipped—it derives its specific name.

I have received information from there, as well as from the Bahamas; but as the methods are all very much the same as those in vogue in German East Africa, I will relate only what I saw and heard there on my visit in May, June and July of last year.

The plantations there are mostly in the hands of large companies, but already the small capitalist is beginning to invest in this business, and the outlook is apparently promising.

The Sisal agave grows best on dry soil containing plenty of lime. The plant is propagated either by shoots or bulbs, but the former are preferred. There is no cultivation of the land. The bush is cut down and grass burned, and the plants are then put in 9 x 9 feet, or about 600 to the acre. The fields are kept weeded during the first two years; after that period the plants are strong enough to keep the weeds down themselves.

When the plants are three years old, reaping begins. The leaves are cut, and the fields cleaned, and new rows are planted between the old rows, in order to keep the plantation going. The planter only reckons upon three crops in all from a plantation. After that the plant "poles" and dies.

Every plant gives about 40 leaves yearly. It is advisable to cut only such leaves as hang at an angle of more than 45° away from the stem. The leaves are taken to the mill, which should be placed as central as possible in order to save transport and labour, for the leaves are very bulky and heavy, each weighing from 2 to 4 lbs.

The mill, or decorticating-machine, which appealed to me most consists of a number of common raspadores fixed to a shaft. These raspadores consist of large wheels of about 3 feet diameter, and 12 to 18 inches face (on which the beating knives are fastened), and a sort of feeding table. On each side of the table stands a native, who introduces one half of a leaf into the machine, and allows the knives to beat off the flesh; then he pulls the leaf out, turns it over, and repeats the procedure with the other end. At each raspador two men do the milling, two boys keep them in raw material, two boys carry the fibre away, and one man scrapes the refuse from under the machine. Thus seven men can do about 5,000 leaves per day of ten hours. Of course one may have as many raspadores (each served by seven men) to one shaft as one requires. A double raspador is reckoned to require 5 H.P. A recent improvement on the raspador is a pair of crushing-rollers to flatten the thick end of the leaf, and an arrangement to throw out the leaf at a certain point, so that the worker need not push or pull and can work a leaf in each hand, and so double the output.

If there is sufficient work, a planter should invest in a large machine, such as the "Corona," the "Condor," or the "Matador." These machines work automatically and strip from 50,000 to 150,000 leaves per day, requiring only six men. To do the same number of leaves in a day on 10 raspadores it would take some 70 men.

The "Condor" and the "Matador" have elevators and hoppers to feed them, so that the leaves need only be thrown in by the armfull at one end of the machine and the fibre comes out hanging neatly over a rail on the other end. With the "Matador" trucks and rails are supplied, and the machine deposits the pulp into one truck and the fibre into another, so that only very few hands are required. The latest improvement with this machine is a complete plant for sending the fibre in a truck to be washed immediately, and from there to a drying apparatus, and next to the baling press, so that fibre can be cut in the morning and be on the train the same day, in spite of any amount of rain.

No doubt our natives are very lazy and very expensive, so that we should use as much labour-saving machinery as possible. I consider it wise even for a small plantation to use a large machine, if capital permits, because the crop comes in so much quicker, and plenty of time is left to extend the plantation with the same amount of labour.

The great question is, of course, always the same:

DOES FIBRE-PLANTING PAY?

I will give a few figures as I have them from different parts of the world, and from them readers can calculate for themselves what the prospects are. I suggest that we should *cultivate* the land for Fibre; then our cost would be, say, for 100 acres:—

	£
Land price @ 10s. per acre	50
Ploughing and harrowing @ 20s.	100
60,000 plants @ 6s. per 1,000	18
Planting	7
Weeding for two years, say	30
(this should be paid for by catch-crops)	
Total	<u>£205</u>
60,000 plants should yield—	
	lbs.
The 1st year, 3lbs. each	180,000
The 2nd year, 1½lbs. each	105,000
The 3rd year, 1lb. each	60,000
Total	<u>345,000</u>
Or some	<u>150 tons dry fibre</u>

which would fetch in England £42 per ton, or . . . £6,300.

From this must be deducted the cost of reaping, milling, transport, freight Home, agency, etc., (@ say £10 per ton, £1,500. This would leave a net profit of £4,800 for 100 acres for three years, or £16 per acre per annum.

Whilst all this is proved for Sisal fibre, it is not so easy a matter to furnish information on

FOURCROYA GIGANTEA OR MAURITIUS FIBRE.

The fact is, nobody can give reliable figures. We can only compare, for we have no plantations yet of any extent and in regular reaping, from the results of which we can judge.

We hear from Mauritius that there the yearly crop per acre is about a ton, and that the aloes are planted 4 x 4 and 5 x 5 feet. We hear also that the same aloes grow considerably larger on the African coast than in Mauritius, and therefore, I think, we may safely reckon upon a ton of fibre per acre in Natal.

In German East Africa *F. gigantea* was planted at first, and enormous plants were obtained (I have seen leaves 15 feet long and 12 inches wide); but when it came to reaping it was found that the leaves contained only ¼ per cent. of dry Fibre. All the plants were therefore destroyed and the Sisal agave put in their place; this yielded leaves 4 to 5 feet long, with 3 per cent. of dry Fibre.

I believe that the coast lands in German East Africa, which are almost under the Equator, are too hot and too rich for *Fourcroya*. A certain small lot grown on the higher land inland, and crushed on one of the plantations, proved to contain 3¼ per cent.

I have crushed many leaves, and have experienced most bewildering results. I have cleaned aloe leaves from this district which were $7\frac{1}{2}$ feet long, weighed $6\frac{1}{2}$ lbs. each and gave 12ozs. of dry Fibre, equalling 12 per cent.; and, again, $3\frac{1}{2}$ year old leaves, which were $6\frac{1}{2}$ feet long, weighed $4\frac{1}{2}$ lbs., and gave only 4ozs. of dry fibre, equalling $5\frac{1}{2}$ per cent.

No doubt rich land produces large, rank plants with large leaves, but these large leaves yield no more fibre than smaller ones. They weigh a great deal, and consequently their percentage of fibre is naturally low.

I have planted *Fourcroya*, and I reckon that I shall get from 700 plants to the acre (7 x 9 feet) and about 22 leaves per plant, weighing 4lbs. each and yielding $3\frac{3}{4}$ per cent. of fibre,

$$\frac{700 \times 22 \times 4 \times 3\frac{3}{4}}{100}$$

100

equalling 2,310lbs., or, roughly, 1 ton, which is worth in England on an average, according to the last 12 months' price-lists, which I receive regularly, £32.

Supposing that the cost of reaping, milling, transport, freight, agency, brokerage, etc., will be about £12, then I shall have £20 net profit per ton or per acre, and that very likely for some years, because the *Fourcroya* seems to live longer than the Sisal. I quite expect, however, that the yield of *Fourcroya* will also fall off to a certain extent after the first crop. But that is of no consequence, as, with such results, we shall simply extend the plantation and so increase our income.

Sisal fibre fetches a higher price per ton, but I expect *Fourcroya* to yield a larger crop, and through that to pay better. Although it is not proved, I consider good results certain with *Fourcroya*.

There remains only one important matter to deal with, and that is the question of the

MOST SUITABLE MACHINERY.

As I have said before, Sisal leaves are from 4 to 5 feet long, weigh about 3lbs. each, and contain rather thick, strong fibre. *Fourcroya* leaves may grow 10 feet long, weigh up to 6 or 7 lbs. each, have a very thick lower end, and the fibre is thinner and weaker than the Sisal fibre and more liable to break in the machine. The consequence is, that we can very well crush Sisal leaves on machines made for *Fourcroya*, but by no means must we take for granted that all machines which clean Sisal leaves well will also be suitable for *Fourcroya*.

I have seen many machines and have also worked them; and I have come to the conclusion that, for *Fourcroya* plantations of any extent, the large "Corona" and "Matador" machines, which save labour and work with a minimum of waste, should be chosen, and for small plantations the simple raspador or "Gratte," as it is called in Mauritius. Both words mean "scraper."

I repeat that all *Fourcroya* leaves of any size have a very thick

lower end, some 3 to 4 inches in diameter, and that these ends must be crushed flat before the leaf goes into the machine; otherwise the fibre contained in that end is simply beaten off and lost. That crushing means, of course, a special machine for large concerns and at any rate extra handling and consequently extra expense.

Only the "Matador" has a crusher combined with the mill. The leaves thrown by armfuls (not leaf by leaf) into the elevators, are turned into the hopper, come out from there singly, pass the crusher and go into the elevator, all automatically. Below the decorticator stands a truck, to receive all the pulp and refuse. The fibre runs into another truck, in which it goes to the wash, from there to the drying apparatus and then to the baling press, with very little handling.

I shall now give a few hints regarding machinery plants for different sized plantations:—

20 acres, equalling about 300,000 leaves, to be reaped in 90 days—

	£
Single Raspador, say	60
Horse-gear, say	25
Crusher (a wooden hammer will do).	
Polisher	40
Press	20
	<hr/>
	£145

50 acres, equalling about 750,000 leaves, to be reaped in 100 days—

	£
Double Raspador	140
16 H.P. Gas Suction Engine (allows for a second Double Raspador to be added when required)	420
Crusher	60
Polisher	40
Press	45
	<hr/>
	£705

200 acres, equalling 3,000,000 leaves or more—

	£
Decorticator, "Matador"	600
25 H.P. Gas Suction Engine	546
Double Polisher	72
Hydraulic Press	150
Five trucks, rails, pump, tank, drying-apparatus, etc.	300
Shed, etc.	332
	<hr/>
Say in all	£2,000

All these are, of course, approximate prices, although they will not be very far out.

RAMIE.

I do not think it is necessary for me to describe this plant; so many have done that before me. It has been long known to contain a very valuable fibre, but the cultivation was not developed, because there was no machine to decorticate the plant—the Chinese do it by hand.

Ramie fibre is used for all fine materials. Tablecloths, linen, clothing, blankets, carpets, laces, silk, neckties, etc., are made partly of ramie fibre, if it is obtainable. There is an ever increasing demand for the fibre.

Ramie requires a damp, warm climate; if it is too cold, it will grow slowly. Good, rich soil should be chosen and tilled 18 inches to 2 feet deep. Continual drought does not do a plantation much harm, but too much wet causes the root to rot in a few days. The plant is propagated by seed or by cutting from the root. The latter method is preferable, as the plant takes so long to grow from seed. The plants are put in 3 x 3 feet, and the field must be kept clean for about three months; after that the ramie will keep the weeds down.

The first crop should be ready six months after planting out. The stems are ready to be reaped when they are 4 to 6 feet high, when blossoms appear and the stems turn brown from the ground upwards. They are cut off close to the ground and run through the decorticator. A small "Aquiles" machine put on a little hand-cart can easily go through the fields as the reaping proceeds.

The refuse remains in the field as manure, and the fibre (undegummed) is dried in the sun and pressed into bales, ready for shipment.

There should then be a crop every three months from good fields.

It is reckoned that each plant grows 45 stems four times a year, so that an acre with 4,000 plants should yield, if each stem weighs $1\frac{1}{2}$ oz. and gives 5 per cent. of clean, dry fibre,

$$4,000 \times 45 \times 4 \times 1\frac{1}{2} \times 5\text{ozs.}$$

100

equalling 54,000ozs., or $1\frac{1}{2}$ ton.

of a value of £33 10s. per ton in England, as was quoted to me about two months ago.

The machine is light, can be worked by a child, and decorticates 10,000 stems per hour. The cost is £90.

I feel certain that the fibre industry has a great future in Natal, and I hope that many farmers will give it a trial. I repeat that none of my data regarding *Fourcroya* and Ramie must be taken as reliable facts, but they are the outcome of over two years of systematical, careful study, and I believe them to be as correct as such calculations can be. I myself have begun operations on the strength of them.

[In the next issue will appear illustrations of some of the machines described in this article.—Ed.]

Ramie.

F. DE V. WRITES in the *Jamaica Agricultural Journal*:—Of all textile plants the one which furnishes the best fibre, containing at the same time the least gum, is a plant of the *Urticaceae* family, named after the German botanist Boehmer, *Boehmeria Nivea*.

In its raw state, that is to say, not yet degummed, the fibre goes by the name of China-grass, very improperly so, for the plant does not grow exclusively in China, and moreover is not a grass. The degummed fibre is called Ramie, an article for which there is a constant and increasing demand.

The Ramie fibre is one of the finest, most brilliant, and at the same time one of the strongest of vegetable fibres. Its commercial uses are so varied that it is hard to tell where it cannot be employed. It makes the finest gossamer cloth, and the strongest and most durable canvas for sails; combined with linen and cotton it increases their strength and lasting qualities, and as for rope and other coarser products, its merits are too well known to be further mentioned.

Cultivation.—The ramie plant requires as even a climate as possible, and a moist heat; regular rainfall and proper planting at the proper time are vital requirements which must be fulfilled by the planter wishing to obtain fibre of the finest quality; its cultivation resembles that of cotton closely; a steady rainfall when the plants are young, and dry weather when they have matured being essential.

The best soil is a fine sandy loam, which must be well drained, as stagnant moisture is the Ramie plant's worst enemy; it causes the roots to rot, which they do very easily, thus, of course, killing the plant, literally drowning it.

The seasonable parishes in this Island are well suited to its cultivation, especially the valley sides, offering ideal sites. Its root-system bears a striking resemblance to the strawberry plant—it sends out runners or racemes, which, when strong enough, can be detached from the mother plant and planted out separately.

It is, however, not so much my intention to dwell on the methods of planting and cultivation as on the harvest of the Ramie stems and their subsequent conversion into the China-grass of commerce.

The plant is fit for cutting as soon as the flower appears. The stems are five to six feet high, and the thickness of your finger. The cut and ripped stems are passed through the machine mentioned briefly in the last issue of the *Journal* (it is called the Aquiles, and is manufactured by R. Boeken & Co., Limited, Dueren, Germany).

The advantages of this machine are, firstly, its low price (£60); secondly, its extreme portability (two men can easily carry it about); thirdly, the low power necessary for its working; and last, but not least, its freedom from delicate parts, easily broken and hard to replace.

As indicated before, the machine is built on an entirely new principle, the most valuable result of which is that the long fibres are de-

livered long, unbroken and in parallel layers, the three points which, together with the colour, determine the market value of "China-grass."

After treatment in the machine, the fibres are dried in the bales and shipped.

Before being sent to the looms, they have to be chemically treated and "degummed." Information as to the method best adapted to degumming is at present not to be had.

Yield.—You may rely on a crop at least every six months. Each plant yields on an average 45 stems each cutting, that is to say, 180 stems per year per plant, or 72,000 plants per acre, if planted 4,000 to the acre.

The average weight of the stems stripped clean being 50 grammes, the annual yield per acre will be 36,000 kilograms, or 64,800 lbs.

Taking into calculation an average yield of five per cent. of raw fibre, the acre will yield $1\frac{1}{4}$ tons of dry China-grass, at a market price varying between £18 to £22, according to the care bestowed in keeping out impurities and producing a uniform long-fibred, even-coloured product. The acre will thus show a yield of £22 10s. to £27 10s. Allowing 25 per cent. for expenses, the net income per acre will amount to from £18 to £22, a figure which should prove attractive enough perhaps to induce some planters to at least give Ramie cultivation a thorough and fair trial.

Lightning.

THE following is extracted from a long and interesting article contributed by Mr. J. P. Pask, A.M.I.E.E., to the *N.G.R. Magazine*:—

In Natal the problem of affording protection to a building is not a particularly difficult one; it is made easy by the generous use of galvanised iron in the construction of our dwellings. I much question whether lightning, with all its evasiveness, could find a means of entrance into a galvanised iron house if the following simple precautions were taken in building it:—The roof and sides must all be joined together in metallic connection; strips of galvanised iron should pass from the roof to the sides, and also join up with the rain-water guttering. One or more conductors, according to the size of the house, should be run down the building, terminating in a short rod about 2ft. 6in. above the highest point of the house, and one should certainly be fixed to the kitchen chimney, if it is made of brick, and if it is an iron chimney it should be connected to the ironwork of the building, or to the conductor itself. The conductors should be riveted and soldered to stout copper plates, which should be buried in damp earth. Up-country, thunderstorms usually come when the ground is like hard-baked clay, and often some fearful flashes descend before the rain falls. These are very dangerous, and as the earth plate is often buried in the hard clay, the lightning rod itself may form a source of danger by receiving a discharge which it cannot

dissipate. The plate or plates must, therefore, be buried in or quite near the dam, if there is one, so that they are always in moist earth. If there is no dam, a gutter should be made, and all water from the kitchen, and that used for domestic purposes in the house, should be led by it to the ground over the earth plate, and so keep it moistened.

The conductors should not be held away from the building, whether of brick or iron, by insulators, but should be supported from it by metallic fasteners or staples, which, while in metallic connection with the building, would keep the rod off some 1½ in. to 2½ in.

For the sake of the timorous, I may mention that during the progress of the storm, it is advisable to keep the windows and the doors closed, so as to avoid draughts; lightning is partial to these. It is also as well to keep away from the chimney for the same reason; and also from using knives and forks, and other metallic objects, if a severe storm is immediately overhead. If you are outside, on no account get under a tree; it is also well to avoid contact with telegraph and electric light poles, as they sometimes give out sparks during a storm. It is also advisable not to run, as the current of air thus set up affords an attractive path for the flash. I have often been asked whether travelling in an electric tram is safe during a storm. Tramcars are frequently struck by lightning, but they are so well protected from the effects of the lightning that it is extremely rare for passengers to be injured or made uncomfortable from the occurrence.

It may be of interest to farmers up-country to know that, in a report prepared by the Weather Bureau of the United States Department of Agriculture, we find stated:—"Unquestionably, wire fences, as now constructed, serve as death traps, causing a vast amount of loss every year; there were evidences that the lightning struck the fences at a considerable distance from the point where the stock was killed."

On account of the parched nature of the veld at the commencement of our summer season, it is difficult to make any form of wire fencing quite safe as regards lightning, and the danger is enhanced by the peculiar susceptibility of horses and cattle to electricity. But we may, however, take such measures in constructing the fence as will ensure our stock a comfortable degree of security. Wooden end and supporting poles should on no account be used. Iron poles must be used throughout. The intermediate posts should go some distance into the ground, and it will improve matters if each post has a base plate. Where the wire passes through the post, it should be in close metallic contact thereto. Stay wires must be fastened to iron plates, not to wooden ones. If there is a stream of water or permanently damp earth near the fence, all the horizontal wire should be joined up to a cable made of about five galvanised iron fencing wires stranded together, and the end of the cable securely fastened to a large iron plate, well buried in the moist earth. I am afraid there is at present no way of protecting oxen and mules trekking across the open veld; the best thing is to stand still during the heaviest part of the storm, and trust in Providence.

Iron linen lines are a source of danger in the same way as the fencing wires, and every year brings reports of women who, in rushing out to save the linen from being spoilt by the rain, have received bad shocks, and in some instances been killed.



UMZINKULU ESTATES CO.

Suspension bridge for steam tram-line : South side.

Fibre.

INTERVIEWS WITH MR. N. C. T. HARPER AND MR. C. ROSITZKY

BY ERGATES.

Six years ago I gave a description (page 143, Vol. IV.) of the Umzimkulu Sugar Estate. The Hon. J. G. Maydon, M.L.A., was the "interviewed" on that occasion. The information as to other neighbouring industries, etc., I find, on reference, to be almost as serviceable as when gathered.

THE UMZIMKULU SUGAR ESTATE.

Mr. Harper is the General Manager of the Umzimkulu Sugar Estate, which, after the manner of Natal sugar estates, has been growing. The Umzimkulu now comprises the Barrow Green, the Esperanza, and the Ruthville estates. The area under cane is being quickly increased; at present 3,000 acres are planted. The mill-power is also growing; an additional pair of rollers 28 in. by 56 in., weighing about 5 tons each, are being put down. On arriving at the mill, where I met Mr. Harper—I came up the river in his motor launch—I found him engaged in the erection of a suspension bridge across the Umzimkulu. The accompanying photographs will show that this is not a small undertaking. In length the bridge will be 480 feet, and is designed to carry a locomotive and a train of cane-loaded trucks. The erecting is being wholly done by the estate hands under the General Manager's superintendence. Mr. Harper, I may here mention, is an engineer by profession.

TELEPHONES.

Before closing my remarks about the sugar estate I must make a short reference to the telephone system installed. There are $4\frac{1}{2}$ miles in the system, and there are five instruments. What was the cash cost? Thirty-two pounds for the plant, including surplus wire and insulators. The instruments cost £2 10s. each, and similar instruments, so Mr. Harper told me, can now be obtained from the Durban Corporation for only 5s., the Corporation having recently discarded the "ringing-up" instruments. Here is a chance for farmers desiring telephonic communication at practically no outlay in money.

FIBRE.

I now come to the subject of fibre; to learn something about it was the main object of my visit to Port Shepstone. I may as well admit that on fibre-growing in this Colony I did not quite possess what is called an "open mind." I was of opinion that fibre would only thrive on a commercial scale in a very tropical climate with very rich soil and a supply of very cheap labour. In these respects I regarded Natal as deficient. With my mind so prejudiced I plied Mr. Harper with questions.

It is necessary in the first place to say something about Mr. Harper. As already stated, he is an engineer by profession. At the Elandslaagte

Coal Mine he installed coal-cutters—the first in South Africa—also at the St. George's Mine. To the Cambrian Mine he supplied ventilation fans extracting 300,000 cubic feet of air per minute, and at Nel's Rust farm he put down an electrical plant, including turbine, generator, four motors, refrigerator, pumps, etc. This would appear to speak well for his mechanical aptitude; and for his general aptitude as a planter eight years with Messrs. Reynolds Bros. as manager of the Esperanza section of their estates, and his present position on the Umzimkulu Estate, should be sufficient testimony. The statements and opinions of such a man naturally had weight with me. For several years he has given some thought on and off to fibre cultivation, and recently he investigated the subject in every particular. Last month he floated a small fibre company in which his interests are almost entirely prospective and contingent.

CLIMATE, ETC.

"Is Natal, I said to Mr. Harper, sufficiently tropical? Can Natal hold her own against countries with deep, rich soil, constant high temperature and constant humidity?"

"Those features," he replied, "I do not think essential. My personal knowledge of fibre, save for many experiments during the last two years, as I have already made clear to you, is limited; my other knowledge is second-hand, but such as it is, it is the outcome of studying all—yes, I think I may say practically all—the literature on the subject. Now, in the first place, we who live in this corner of the Colony know that the fibre plant called the *Fourcroya gigantea* aloe of Mauritius thrives well when we plant it under reasonable conditions as to situation. In size our aloes are larger than those grown in Mauritius, and experiments which I and others have made have shown even an advantage in the Natal-grown as regards the proportionate output of fibre. Commercially, of course, one wants fibre—not flesh; indeed, when it comes to the manipulating, the greater the proportion of the watery flesh the greater the attendant expenses. In 1902 Yucatan produced £2,750,000 worth of fibre. In the previous year, when the price of fibre was low, Sir D. Morris, then Assistant Director of the Kew Gardens, estimated the profit per acre at £5.

LABOUR.

"And now,* I said, "as to labour? The cost of Natal labour must surely compare unfavourably with that of fibre-producing countries. I think we may take a man's work to cost here in Natal quite 8s. per week."

"Yes, about that, but it should be remembered that there is plenty of light work in cultivating aloes that coolie women can do, and that would bring down the price somewhat. In Mauritius fibre growing pays, and pays well, and there you have the wages question practically the same as in Natal. My friend Mr. A. C. Mitchell-Innes recently visited Mauritius with the object of closely investigating the business there in fibre production. The most of the fibre in the island comes from uncultivated

UMZIMKULU ESTATES CO.
Suspension bridge works on North side.

naturally growing aloes, and the manufacture of the fibre from them is conducted most primitively and wastefully. There are, however, two or three estates where fibre growing is being methodically managed, and the accounts, kindly shown to him, proved that over a series of years, despite heavy freight and shipping charges, each ton of fibre gave not less than £10 clear profit. Here, then, is an example where the rate of labour is practically on a par with that of Natal. It should also be taken into consideration that Mauritius—also Yucatan and several other fibre countries—is subject to winds of hurricane force, winds that do serious harm to the fibre in its growing stage, and in consequence must affect the Mauritian profits over what Mr. Mitchell-Innes calls a series of years. Now let us refer to the price of labour in the Bahamas—a fibre country to which you have referred. This British Colonial-Office publication gives 9s. a week for mill hands and 5s. for field hands, a price for labour not varying much from that of this country. These figures of the Bahamas may be of interest; in 1899 25,000 acres were under cultivation, and the output of 1,358,682 lbs. of fibre—Sisal—showed an increase of 106,952 lbs. on the biggest of previous years. On the cost of labour I am of opinion that there is no sufficient cause for misgivings. In connection with this question there is the great advantage that with proper management the work can be carried on evenly all the year round; there need be no rushes, as with sugar, cotton, etc.”

The foregoing gives the gist of a lengthy conversation, much prolonged for the verification of all statements by constant reference to official pamphlets, Consular reports, etc. At the conclusion Mr. Harper said he would introduce me to Mr. Rositzky, of Port Shepstone, who was also a thorough believer in the profits of fibre growing.

MR. ROSITZKY'S VIEWS.

Mr. Rositzky is a German who has a store in the village of Port Shepstone and a farm a short distance away. This year Mr. Rositzky has put in a hundred acres of *Fourcroya gigantea*, the Mauritian aloe, by way of a commencement. Mr. Rositzky has unshakable faith in fibre growing for the Port Shepstone district. He is an enthusiast with public spirit, and is incessant in his counsel to the small farmers of the district to go in for fibre. Many of them, he says, are making only the barest existence, and their farming, he believes, cannot lead to anything better. He would much like to see everyone of them putting under fibre just 10 or 20 acres every year. For the planting and cleaning, he believes that not much labour beyond that provided by the families would be required, and from the fourth year he holds they would be in possession of comparatively substantial incomes. Of course, if three or four neighbouring farmers would combine, firstly by growing the fibre as centrally as possible, and then by buying the necessary machinery together, there would be advantages to be mutually reaped. The necessary

machinery would not be disproportionately costly; say, horse or ox gear £25, a gratte or raspador £60, polisher £40, and press £20. This comes to £145, and the first crop of 20 acres could, he believes, be safely relied on to give at the least £200 of profit. Thereafter the small grower would be fairly started in the industry. Even about the machinery he thinks the grower need have no cause for anxiety; he feels sure that if the small farmers took to growing the fibre generally there would be individuals ready to provide and work the machinery on hire or on shares.

Mr. Rositzky, as I have said, is an enthusiast about fibre growing, but for all his statements and opinions, on provocation and without provocation, he brought up whole armies of recorded facts which, so far as I was able to judge, carried conviction. What he said in the course of our conversation may be summarised as follows:—

FOR SMALL FARMERS.

“The *Fourcroya gigantea* grows well in this district, where we have scores of small landholders doing no good for themselves. How many of them live is a mystery. If they would only grow fibre on a co-operative system money would come to them. I gave much time and spent some money to equip myself with knowledge of the details of the whole subject so as to formulate a scheme. I have not yet been able to influence them, nor indeed to awaken any interest among them; they are terribly apathetic. I am starting fibre growing on a small scale, and when they see that the fibre brings in money to me I hope they will follow. In their position they are able to put every year a few acres into aloe cultivation at hardly any cash outlay.

FIBRE IN GERMAN EAST AFRICA.

“When I got hold of the fibre-growing idea, the idea soon got a firm hold of me. So firm was the hold that I determined to visit the fibre growers in German East Africa. I was most kindly received. The Governor gave me all the information at his disposal, and from the planters during my stay of a couple of months I received the greatest hospitality, and everything as regards cultivation and manufacture they not only showed me but allowed me to take a hand in. With such facilities and being keen to learn, I consider that I have now a fairly good grip of the business. The German planters on the rich Coast lands began with the Mauritian aloe (*Fourcroya gigantea*), but soon found that the raw leaves gave only $\frac{2}{3}$ per cent. of fibre. As a plant this aloe on the coast-lands of East Africa flourishes to perfection. I saw plants fully 15 feet high and the leaves a foot in breadth. Recently, however, it has been found that the *Fourcroya* planted inland runs less to flesh, and on a small scale has given as much as $3\frac{1}{2}$ per cent. to the leaves. The planters all work independently of each other; there are no central mills. The *Fourcroya* has been wholly abandoned for the Sisal agave. Sisal fibre fetches more than the *Fourcroya*—at present the balance in favour of Sisal is £6 to £7 per ton. Sisal in East Africa gives three

crops; in its first year (fourth year since planting) 3 lbs. of fibre per plant, second year 1½lbs.; third year 1lb., or, per acre, respectively:—1 ton: 1,250lbs. and 700lbs. When the first crop is cut new plants are planted between the rows. In German East Africa there are about 10,000 acres under cultivation, and every fortnight in the year may be seen the shipping of several hundred bales of the fibre from the Port of Tanga for Europe. The present price per ton is £42 10s., which, over six years, gives a gross return of £85. The freight and shipping charges to Europe amount to about £12 10s. per ton. About labour? The price per month is about 10s.; nearly all the work is done on the task system."

SOME IMPRESSIONS.

The foregoing evidence—much summarised—as to the practicability of growing aloe fibre profitably in this Colony is most encouraging if not conclusive. Both Mr. Harper and Mr. Rositzky are shrewd, cautious men, knowing the agricultural conditions of their district perfectly, and in all respects are eminently practical. Speaking personally as "Ergates," I have the greatest hopes in the success of the industry. The aloes appear to be immune from locusts and other plagues, spells of drought do not injure them, and, if properly cultivated, they run no risks from winter fires. That the aloes of commerce are not indigenous to the Colony appears to me to be a fact of small moment. The *Acacia mollissima* is not indigenous; instead of growing naturally in vast forests, it has to be raised from seed and cultivated, and yet our wattle-plantation owners can tell that the profits accruing are substantial. So may it also be in fibre growing. As to profits, they will vary according to the fluctuations of the market. An American fibre Trust some years ago ran the price up to £75 per ton, and on the Trust bursting the price collapsed to £15 per ton for a short time. There seems to be every reason to believe that fibre in the Colony can be produced under that price per ton, and therefore the chance of actual loss requires barely any consideration. In these remarks I am assuming that the management will be competent. If the growing should be undertaken by an individual as a bye or side industry there may be some latitude for slack management, but in the case of companies and syndicates, necessarily encumbered with special expenses, the management should be as perfect as it is possible to obtain. Such enterprises should follow the system of the best of wattle companies as regards the financing and the office work, and every share-owner should realise that practically everything will hang on the management. The man on the spot must be capable, energetic, and, above all, a first-class hand at organising coolie labour to the best advantage. No detail should he consider too small for his personal attention; proper attention to details will be the chief factor as regards success or non-success. Considerable mechanical knowledge on the part of the manager will also be indispensable. Happily such men are to be found on the Coast; the sugar companies produce them.

Extreme Types : Their Multiplications.

C. J. DAVIES, in the *Live Stock Journal*, writes:—New knowledge tells us that every character in an animal is represented by definite units in the germ cells, which units are responsible for its transmission from one generation to another. This conception of the germ cells as composed of a host of units, present in definite numbers, some active and some inactive, suggests, moreover, that the individual must be valued rather for the units it bears than for its obvious external characteristics. In future we may be certain that the test of breeding alone will reveal the hereditary value of animals of unknown parentage, although in the case of those whose parentage is known a fairly accurate forecast can be made of what to expect under given circumstances. Mendel's principles only deal, however, with the broad issues in connection with breeding. They give us a clue to the workings of heredity under conditions of cross-breeding between any two definite unit-characters, and this is, of course, extremely valuable to a large class of breeders.

Men who are breeding stock for the showyard, however, are not as a rule practising any form of cross-breeding. That has been done generations back; the animals have been selected until their germ cells contain a certain combination of units which give the required type (so-called purity), and forthwith the breeder endeavours to exaggerate the already-existing characters in certain directions by in-breeding. Some points he tries to increase, others to suppress, but in either case he alters already-existing material in one direction or the other, which is an entirely different process to the recombining of old materials which constitutes the making of a new breed or variety.

We know that the units in the germ cells are unchangeable entities—that is to say, that the unit representing, say, black colour in an animal is quite distinct from the unit representing red colour, and that one cannot be changed into the other. To this extent the units are absolutely stable, but some most noted experimenters have been forcibly drawn to the conclusion that the units themselves are liable to a considerable degree of fluctuation within themselves, and that it is this instability or degree of activity of the units themselves with which the fancier chiefly works. It has certainly been lately suggested by someone that every fluctuation may be represented by definite units, but that such is hardly likely to be the case experiments with animals and plants go to prove. For instance, the writer in some investigations into colour heredity in guinea-pigs crossed an individual of a very pale shade of cream with another of a dark colour. The offspring all came patched with the two colours (neither was dominant), the cream being of a light shade in every case. On subsequent in-breeding segregation occurred, and among the numerous offspring bred in succeeding generations from the one original pale cream were animals of all shades, from the palest cream—almost white—to the richest fawn. Surely this must be a case of fluctuating variability in the intensity of the colour itself rather than a phenomenon due to any other cause.

These guinea-pigs have also illustrated in another way the degree

of activity of the colour units themselves. As already stated, the mating together of two distinct self-coloured animals resulted in the production of bi-coloured individuals patched with both colours. The amount of the two colours present in the progeny of the first and subsequent generations is subject to marked variation. Sometimes the colour on one original parent, sometimes the colour of the other, predominates, but on an average, among a number of individuals the inheritance of each colour appears to be about equal. Only one guinea-pig in about thirty bred so far has come with about an equal amount of both original colours evenly distributed; as a rule, the animals have a preponderance of the dark or a preponderance of the light colour. Further experiments now in progress alone will prove whether it is possible to regulate the inheritance by mating an individual which has too much of the light colour with one which has too much of the dark, so as to get with a fair amount of certainty a race which is characterised by an equal distribution of both colours.

We have mentioned this matter to show that fluctuations produce nothing new, but are limited to increase or decrease of what is already available. The matter is therefore of the greatest importance to all breeders of show stock, whose object is not to create anything new, but to exaggerate or increase or decrease certain characters which already exist. The fact that there are two kinds of variability is often overlooked by students of Mendel's Principles, and it is therefore essential that the difference should be understood. Changes of wider amplitude are connected with the acquisition or loss of unit characters. Lesser variations (with which the breeder of "pure" stock has to do) are believed to be due to the degree of activity of the units themselves. Once the foregoing principles are grasped, the breeder is in a position to study the laws which govern the multiplication of extremes. It necessitates a dip into Quetelet's famous law of fluctuating variability, to the significance of which little importance was attached until quite recent years, and which has now been the means of clearing up many difficulties in connection with heredity.

Quetelet's law asserts that "the deviations from the average obey the law of probability. They behave as if they were dependent on chance only." To try and explain this simply, we will suppose that 15 h. 2 in. is the average height of a certain breed of horses. If a number of specimens are taken haphazard and measured, it will be found that there will be a dense crowding of instances around the average of the variety, and that on both sides of the mass of the observations there may be a few wide deviations. Thus, presuming 15 h. 2 in. to be the average, almost all the horses will vary between, say, 15 h. 1 in. and 15 h. 3 in., but there may be one or two which will only measure 14 h. 3 in., and one, perhaps, which so far exceeds the average as to measure 16 hands high. Now extremes, whether they be of height, weight, length, size, or some purely minor and minute characteristic, are what the breeder for the show-ring is desirous of multiplying, hence the value of finding out in the first instance the average dimensions of the point in question in the particular breed. Once he gets at the average, subsequent measurements of his stock will at once tell him whether they approach the average or are deviating in either direction. Whether the desire is to reduce or suppress a character, or whether it be to exaggerate it, accurate measurement,

weighing, etc., are the only means by which an exact knowledge can be gained of progress towards the desired end, and by which the identity of the widely-deviating individuals can be ascertained.

Once the extreme is identified, the next problem is to bring about its multiplication. Certain facts have been proved in this connection. In the first place, assuming for the sake of simplicity that the average fluctuation of a certain quality in a race is around fifty, rigid selection through a number of generations of extreme types can be made to result in individuals with as wide a deviation from the average as ninety-nine on the increasing side. Further than this it is impossible to go, and a race is only kept up to this extreme limit by continual artificial selection of widely-deviating individuals. Even selection will not bring about the desired result at once, however, because it has been found that the average of the progeny of extreme types lies between that of the original strain and the quality of the chosen parent. Thus, if we are endeavouring to increase the height of horses of a breed which averages 15 h. 2 in., and we find ourselves in possession of an individual which has deviated in the desired direction, and is 16 hands, on breeding from this animal the average height of his progeny will lie about midway between its own height and the average height of the breed—that is to say, a new average of 15 h. 3 in. will be established. In addition to this, fluctuation around this new average will follow the same laws as in the previous case, hence, although the majority of individuals will crowd round the new average of the strain—15 h. 3 in.—yet the wide deviations may give rise to an individual of 16 h. 1 in. If the latter is bred from and is mated with the strain, the average will again be raised to midway between 15 h. 3 in. and 16 h. 1 in., with the possibility of corresponding wide deviations. Thus, step by step, the height can be increased and extreme types multiplied, and the same rules, of course, apply to deviations in the opposite direction. Naturally, very wide deviations are extremely rare under ordinary conditions of breeding, and we have used a rather crude illustration in an endeavour to explain the principle. As a matter of fact, the utmost skill of the breeder will be required in many cases to detect the slight deviations in desirable directions in definite characters, but he may know that once he has identified such he can by breeding from them raise the average of his strain in these particulars, and may in addition have the good fortune to breed an individual which deviates as widely from the new average as did its parents from the old.

The fact that the average of the progeny when breeding from extreme types is higher than that of the race at large, but lower than that of the chosen parent, has no doubt often been a source of disappointment to the breeder. As a matter of fact, however, an animal with a markedly exaggerated characteristic of a desirable nature does more good to a breed by raising the average of this point than he would if he only became the sire of one or two phenomenal individuals in his life, and in future it will be unwise to too hastily condemn an animal as a stud failure because he or she has failed to become the parent of progeny showing an equally wide divergence. The strain is improved by breeding from such, and this is a work of greater value to a breed than many more apparent benefits.

We learn, then, that rigid selection of fluctuating individuals is one of the chief factors to the multiplication of extreme types, and it is

furthermore known that the smallest lapse in this direction will in one generation bring the most deviating strain back to the average of the variety. Although a type has to be built step by step from generation to generation, yet it may come down with a run, so to speak, as it is essentially unstable. Once the breeder grasps that unit-characters are stable, but their fluctuations are essentially unstable, he will be on a fair way to having mastered one of the most important points in connection with breeding show stock. This matter is also a key to the necessity for in-breeding prize stock, and, furthermore, gives us a clue to one of the reasons why the crossing of different strains of the same variety is seldom successful.

Naturally we get a further piece of evidence, if such is needed, of the futility of breeding from inferior individuals and trusting to their pedigree, and reversion, and what-not, to give us better stock than themselves. Another factor in the perpetuation of anomalies is nourishment. It has been found in plants, and there is strong reason to believe that the same rules apply to animals, that badly-nourished races tend towards reversion. This is not only so with regard to single individuals, but affects future generations. Thus, well-nourished parents and well-fed offspring should result in a higher quality of stock than badly-nourished ones, as favourable circumstances strengthen variable peculiarities.

In conclusion, it should be borne in mind that a distinct line has to be drawn between the production of progeny and production of high-class progeny. The former we know, according to Mendel's discoveries, will always be broadly the same. In the breeding of winners we are dealing with something much more subtle and intangible, and it is only by a study of the principles which are believed to influence fluctuating variability that a proportion of deviating offspring can be looked for with a fair amount of certainty.

Paspalum Dilatatum: Its Merits.

THE following letters recently appeared in the *Journal of Agriculture, W.A.*:—

"I have just read," writes Mr. B. Harrison, Tweed River, "in the *Western Australian* of December 23rd of the projected relinquishment of the timber industry by your company in the Denmark region, where 'Agricola' says 'there are thousands of acres of land of first-class quality, consisting of a red loamy formation resting on a clay subsoil,' and 'your company's line of railway, 29 miles in length, also affords access to additional immense areas of Crown lands of a similarly satisfactory character.' I have read the article which I have just quoted, with great interest, more especially as I know from many years' experience what immense profits and progress your company could make if it embarked in the dairying industry and stock raising, profits from which very few of your landowners in Western Australia have but a faint idea.

"This will be readily apparent to you after the perusal of my circular, a copy of which I enclose, and I also forward you a small sample of seed.

I feel confident that the marvellous Paspalum grass would do well in the Denmark district, and in conjunction with the dairying industry would return greater profits than would ever be possible with the timber industry.

"The Paspalum grass has proved a mine of wealth to the North Coast; it grows in all classes of soil, even on barren sand, and preserves its verdure through summer and winter. Any land on which this grass is established is worth £10 to £20 per acre, and in this district has reached the reserve price of £32 per acre, and the annual rent for Paspalum pasture varies from £1 to £1 10s. per acre.

"A creamery could be erected for £10,000 or £15,000, and if one was erected I feel certain that your land would soon be settled with a large population of thriving farmers.

"It is unnecessary to say more on this subject just now, as my circular and letter will amply prove the truth of my suggestion, which I trust you will carefully consider, and in the meantime I beg to subscribe myself.

"P.S.—I would feel pleased if you would kindly send reply, and I will give any further information on this subject at any time. Paspalum grass is already growing well in several places in Western Australia, and Mr. W. C. Grasby, of the *Western Mail*, says it gives greater promise of success than any grass yet introduced into that State."

The following letter was written by Mr. Harrison and published in the Press on this subject:—

"Would you kindly permit me to give your readers a little information about this celebrated grass which is already growing in many places in your State, and which will, I feel certain, prove of inestimable value to the farmers of Western Australia when they become acquainted with its excellent qualities. The great want in your State, judging from all I have heard and read, is a good and abundant summer grass, and Paspalum is the fodder plant for this purpose. Mr. C. F. Julius, secretary of the Dairymen's Union, Bucca Creek, N.S.W., says in the *Agricultural* (Government) *Gazette*:—"This remarkable plant is quickly coming to the forefront as a grass peculiarly adapted to our uncertain climate. Being a deep-rooter, its properties as a drought-resister alone proclaim it invaluable, and, while throughout the warmer seasons of the year it surpasses all other grasses in the rapidity and abundance of its growth, the severest of our frosts, although retarding its growth, fails to subdue its evergreen state." It is most efficacious in subduing and preventing noxious growth—a great point in its favour in Western Australia particularly, where the poison plant is so prevalent and proves so injurious to stock. The *Agricultural Gazette* also says:—"A pasture of Paspalum generally thrives so vigorously as to take complete possession of the ground to the extermination of all the other growth." This is the favourite grass with the stock-owners and dairy-farmers on the North Coast of New South Wales, to whom it has proved a mine of wealth, as it is unequalled, not only for its abundant yield and its adaptability to grow well in all classes of country, but also for its fattening and butter-yielding qualities. The Byron Bay Butter Factory, which was established by our farmers about ten years ago, now pays away annually about £36,000 per month to its suppliers for cream and pork, and the cows from which the milk for this factory is obtained are almost ex-

clusively grazed on *Paspalum*, and very few of them are either hand-fed or housed during the winter months. I feel certain if the farmers and stock-raisers of Western Australia were acquainted with the great value of this marvellous grass they would not delay in cultivating it extensively, which, once established, remains permanent and enriches the soil in which it is grown, and in Western Australia should carry a bullock per one acre and a half. In the Tweed district it carries more than one head per acre, but the soil is richer here and the rainfall greater than in your State. I need not state the different varieties of soil in which it grows, except to say it thrives best in a moist situation, although it grows well even on the hard bare ridges and soils where other artificial grasses would prove a complete failure. The *Agricultural Gazette* writers also say, 'Our experience goes to prove that *Paspalum* will grow well and yield abundantly on poor soils in dry areas.' Mr. Grasby, writing in the *Western Mail* of the 6th January, quoted many instances of its successful growth in Western Australia, and he also says that there are local varieties which cause the market gardener some trouble to eradicate. This fact alone would prove that this celebrated grass would do well in many places, as similar conditions would suit the cultivated variety. In purchasing seed great care should be exercised, as much of that obtained from seedsmen is of a very poor quality, and, judging from the correspondence I have received from people in the other States, very little, if any, of the seed they have purchased has germinated, thereby causing dissatisfaction and much loss. At the Hawkesbury College only about 2 per cent. of the seed would germinate, although the grass grew well. Mr. Jas. King, president of the Tweed River Dairymen's Union, says:—'Seed that is grown in this (the Tweed) district is generally well developed. Indeed, if properly harvested, almost every seed will grow.' This should be borne in mind by those desirous of obtaining good seed, and would prevent both loss and disappointment. Land laid down with *Paspalum* (after being sown with seed at the rate of 15 or 20 lbs. per acre) should be worth from £10 to £15 per acre. I noticed in the *Western Mail* that at Wigan there are 3,000 acres of timber felled and ready to be burnt off or fired shortly. If this ground was sown with *Paspalum* and a co-operative butter factory erected it would prove an object lesson to farmers of Western Australia, who do not appear to have an idea of the immense profits to be made from dairy-farming. Mr. G. H. Varley, editor of the *Clarence and Richmond Examiner*, is well known, and this is what he says of *Paspalum* in the North:—'In a letter on the North Coast Railway proposition, Mr. G. H. Varley, of Grafton, made several references to the virtues of *Paspalum dilatatum*, which shows what wonderful fodder that grass supplies. Having mentioned the preponderance of forest ridge country, he says, "Critics will probably suggest that this class of country is of little value for grazing dairy cattle. But in this connection they may not understand the wonderful adaptability of *Paspalum* to this variety of country. It is a wonderful fodder plant. Given a sufficiency of moisture, it will flourish in all classes of soil. I have seen it luxuriating in the swamps, with water over its crown; in the Big Scrub in its glory; but nowhere have I seen it grow with greater luxuriance than on the forest ridges. A few years ago the Richmond was threatened by a weed called the Mullumbimby Couch. Cattle fell away on it, and many died. Since the introduction of *Paspalum* this weed has had notice to quit. As in quality,

so in growth, as compared with other grasses—it is *Paspalum* first, the rest nowhere. It is only the construction of this railway and the throwing open of these reserves which will attract settlement. Under these conditions an energetic man, backed up by *Paspalum dilatatum* and cows, is almost sure of success. Take the 'big scrub' of the Richmond as a case in point. Fifteen years ago this magnificent tract of country was practically in its primeval state. It was equally provided then, as now, with steam communication to Sydney. No point of it was more remote than 15 miles from water carriage. Yet no progress was visible. Five years later the railway from Lisimore to the Tweed was opened. From that day the jungle began to disappear, and to-day the whole face of the country is altered, *Paspalum dilatatum* being substituted for scrub, and dairy cows for paddymelons. One butter factory alone, which opened with the advent of the railway, has increased its output from one ton a month to 350 tons a month. A herd of cows will easily average £10 per head per annum. One farmer (resident in the Coramba district) published his receipts for one year, which showed a credit balance of £600. His area was only 160 acres.

"Mr. H. Munsey, of Dundas, N.S.W., says: '*Paspalum* is the grass that has revolutionised the dairying industry on the North Coast. Scores of instances can be quoted showing that the capacity of farms has been doubled and trebled, and it forms a dense mass of succulent forage. Having spent over a month going through farms where this grass has been sown, I can safely recommend its planting on a large scale. I have seen farms where 100 head of dairy cattle have been kept all the year round on less than 100 acres of land, giving splendid returns in milk and butter. This grass, if enclosed for a short period during the autumn, will provide a good supply of feed for the winter. Its value at this stage cannot be expressed in thousands of pounds. In conclusion, I need only say, as Mr. Jas. King (President of Tweed River Dairymen's Union) says, "that to write of the merits of *Paspalum* would require a newspaper."'

"In conclusion, Mr. Editor, I must apologise for trespassing at such length on your valuable space, and I most sincerely hope that what I have written may prove of great benefit and value to the farmers in your State, who should not hesitate or delay in bringing about an era of prosperity by establishing good and abundant pasture—the first step towards founding dairy factories which have proved such a great boon to the settlers in the other States. I will be only too pleased to give any further information to anyone, providing they forward stamps for reply, and thanking you in anticipation,—I am, etc.,

"B. HARRISON.

"Burringbar, Tweed River, N.S.W."

To establish bull-baiting seems a curious form of charity, but in 1661 a certain George Staverton gave the sum of £6 yearly to buy a bull to be baited at Wokingham; enjoining that the flesh, hide, and offal should be sold, and bestowed upon poor children "in stockins of the Welsh, and shoes." The bull was baited until 1825, but since that date it has been put to death in a more merciful manner, and the meat given to the poor.

The Preservation of Fresh Fruit.

IN a recent issue of the *Bulletin de l'Office du Gouvernement General de l'Algerie* appears an article on the preservation of fresh fruit on long journeys. Accounts are given of experiments that have recently been conducted, and from them it appears that peat or turf has been found to be eminently suitable as a means of preserving fresh fruit.

The attention of hygienists has been attracted to this substance by reason of its sterilising properties, constituting, as it does, a medium unfavourable to the development of bacteria. The existence of such qualities will secure for peat a large sphere of usefulness.

It is, however, in the preservation of fresh fruit that this substance will be more particularly used. Experience has shown, it is said, that it is superior to every other substance for the preservation of vegetables and fruit which have to survive long voyages.

Among other experiments, it is mentioned that, at the beginning of last year, eleven packages of about eleven pounds, containing oranges, mandarines, and lemons, were sent by parcels post from Palermo, in Sicily, to Togo, a German Colony in Africa. Fruit were sent in reed baskets, packed in fruit paper and peat. Envelopes of silk paper were used to keep the fruit humid. Each parcel contained eight oranges or twelve mandarines. There being no direct communication by sea between Mediterranean countries and Togo, the consignment had to travel *via* Hamburg. At Togo the parcels were kept awhile before being forwarded to their final destination—a town in the interior of the Colony, at a distance of over 230 miles from the coast.

The packages that arrived in the soundest condition were those which were considered most liable to damage, and which were only protected by a rough covering of interwoven reeds. It was observed that the fruit enclosed in boxes covered with tinplate as a rule showed traces of moisture.

Out of 45 fully ripe oranges packed at Palermo, 41 arrived at their destination in a perfect state of preservation, after a voyage of 55 days. The mandarines, generally speaking, also kept well.

The same method of packing was tried in the transport of young trees. The great difficulty was to keep them humid whilst protecting them against moisture. The attempt had been made several times without success to import plants from nurseries in Egypt. By using peat, however, success was ensured. So satisfactory were the results obtained, that it is proposed to import orange trees into German East Africa from French possessions.

These experiments, it is observed, have shown clearly that peat is an invaluable means of preservation in the packing of fresh fruit. Exporters of fruit will be able, by the use of this substance, to purchase when prices are at their lowest, and keep their fruit until sufficient

quantities are obtained to make large consignments; and the employment of the new preservative will permit, in the same way, of fruit being gathered and kept for consignment in large quantities to local markets.

Mr. Melmoth G. Kelly, the Acting Conservator of Forests, after careful investigation, is of opinion that, provided the fruit was properly picked and handled, well sweated, and carefully packed, there appears to be nothing very extraordinary in the test described. The loss was just under ten per cent., which Despeissis states is the average loss for curing and long keeping.

The Progress of Agricultural Organisation in Great Britain.

SOME evidence of the strides which the Agricultural Organisation Society (England) is making in its endeavours to instil into the farming population of Britain the principles of co-operation and the necessity for practical combination if England is to fight the foreign producer in her own markets, is contained in the latest Report of the Society to hand, for the eighteen months ended 30th June, 1906.

At the annual public meeting of the Society for 1906, the Most Hon. the Marquess of Zetland, K.T., who presided, remarked, in the course of his address, upon the position of a British farmer acting entirely on his own account, and without co-operation with his neighbours. On one side of him they saw manufacturers, tradesmen, and others, all of them only too anxious to supply him with those articles which are essential for the management of his farm at the highest prices that they could induce him to give for them. On the other side of him again they saw tradesmen and others of different kinds, one and all of them equally anxious to take off his hands the fruits of his industry, at the lowest possible prices they could induce him to accept. Speaking in a somewhat figurative manner, he thought they might compare such a farmer to a unit between two opposing forces, each of those forces desiring to obtain a profit for themselves, but neither of those forces appearing to be too solicitous as to the welfare of the individual on whose industry they desired to thrive.

Continuing, the Chairman said he thought it stood to reason that a group of farmers acting together, cultivating for their mutual advantage, and sending, say, for example, one large order to the manufacturer for such articles as they required for working their farms, would be in a better position to make a good bargain for themselves than if they each of them made their own purchases, especially if those purchases were made from the shopkeepers instead of going direct to the manufacturer.

Speaking at the 1905 Annual Public Meeting, the President of the Society, Mr. R. A. Yerburgh, M.P., well expressed the position of the farmer who does not adopt co-operative principles by remarking that the farmer buys retail and sells wholesale. The Society wanted to reverse that process, he continued; they wanted the farmer to buy wholesale and sell retail: broadly that was what they were aiming at. They

did not want to decrease the character of the yield of the produce, but they wanted to make the land more productive and the produce still better in quality, for they maintained that English produce was the best of all. The system of co-operation was a very difficult one to bring home to men's minds. In interfering with the past one had to go very slowly and carefully. Of all forms of co-operation the easiest to deal with was that for the purchase of requisites, and, therefore, it was easy to understand that, in the steady growth of their organisation, by far the larger number of societies was engaged in purchasing farmers' requisites, seeds, manures and things of that character. He did not wish to weary the meeting with details, but he could say generally that great savings had been effected by purchasing in combination. The Secretary of the Eastern Counties Farmers' Co-operative Association, which consisted principally of large farmers, reported they had obtained a reduction on various things of from 10 to 50 per cent. He could go through a long list of societies, all of which had effected similar savings upon their purchases for the year. But there was another form of saving to his mind even more important than the saving in price, viz., the enormous saving to the farmer in the fact that by this system he got what he really wanted to purchase; he got a guaranteed article of the best quality. Under present circumstances a farmer often bought an article which was very different from what it purported to be. One result of this advantage of combination was that the farmer would get a better yield, whether in the case of crop-producing or stock that was to be put upon the market. Co-operation for the sale of produce was a much more difficult matter. It had to be approached with the greatest possible care. Experience had shown that it was wise to commence from the very bottom, to organise small societies, so that they might grow and combine and co-ordinate with other societies, and in time be able to sell a large amount of the goods they produce. To attempt to start with a very large society was, in their opinion, and in the opinion of those who knew the subject thoroughly, the certain way to court failure. They had to organise the producer before they organised the distributor; to reverse that process was a mistake. Co-operation was not an easy matter to grasp, and sound principles must be laid down before they attempted to grapple with the more difficult problems. Men must first be accustomed to deal with the easier methods, and therefore they must not attempt in the first place to deal with the sale of produce.

Continuing, the President said that with regard to dairy farmers they had a society which had been selling large quantities of whole milk in London, the Eastern Counties Dairy Farmers' Co-operative Society, whose turnover last year was no less than £27,084. The Secretary of that society reported that milk, which at the time of its formation sold for 1s. 7d. per barn gallon in the winter months and 1s. 2d. in the summer months, would now fetch as much as 1s. 8d. and 1s. 4d.

The Newark Dairy Society and the Vicar's Farm Society had been sterilising milk and selling it in bottles with great success. A Lancashire society had been crushing oats for its members, and 2d. more per bushel was obtained from them than the ordinary market price. The Framlingham Co-operative Society had sold half a million eggs, and the price to the producer was about 25 per cent. better than he had previously obtained. With regard to fruit, the Evesham Growers' Association had

established a central depot and had disposed of 1,000 tons of fruit and vegetables at prices very satisfactory to the producers.

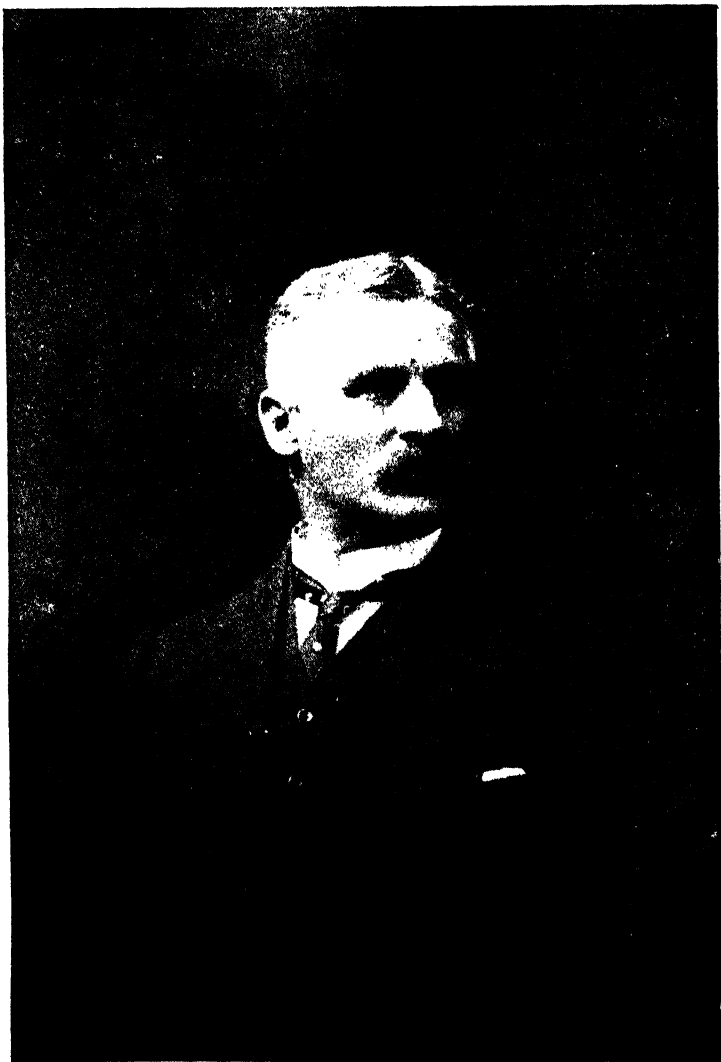
Mr. Yerburgh drew attention, in a speech at the Annual General Meeting in 1905, to the fact that a society in Gloucestershire had found it possible to start an auction mart. The farmers there are now buying and selling cattle on their own account, and the profits that hitherto went to the auctioneer are now reserved for the farmers themselves.

An idea of the rapid growth of the Agricultural Organisation Society may be gained from the fact that, in 1903, there were 73 affiliated societies, and that, in 1904, the number had increased to 103, and, in 1905, stood at 113. The membership had grown from 4,500 to 6,500. The turnover of the societies had increased from £55,000 to £150,000. In 1904 only 18 counties were touched; in 1905 societies had arisen in 15 further counties—33 in all. Experience has shown that when one society is formed, and carried on as these societies are carried on, with business aptitude, and has proved itself to be a benefit to the farmers, other societies are rapidly formed in the district. The formation of one society thus means that other societies in the same county rapidly spring into existence.

How these societies prosper and what they can do is seen in the case of the little society at Beckford. Four years ago it started with a membership of fifteen and a turnover of £536, and a profit was made of £7 7s. At the end of two years the membership had increased to twenty-one, the turnover to £1,748, and the profit to £23. They had been faced with trade difficulties, and the profit was made after cutting everything down to the very lowest. In the third year, while only increasing their membership by one, the turnover reached £2,573, and the profit was £80. The capital was only £48, and a reserve fund of £30 had been created, and a bonus of 2½ per cent. had been distributed to the members.

One argument advanced against the success of the Agricultural Organisation Society is that its principles are only applicable to the case of the small farmer. The Ipswich Society, the President points out, is, however, a practical refutation of that suggestion. A considerable proportion of the farmers joining that society are what are known as large farmers, one member of the society farming no less than 4,000 acres. In view of the interest displayed by men in that position, it is evident that the co-operative movement is applicable also to the large farmer.

As regards the future of the society, the President continued, they had to obtain the cordial co-operation of everybody, and the support of all opinions. He had observed during his study of co-operation that, when farmers get into the habit of combining together, their interest is quickened; they look beyond their own immediate surroundings, and they begin to recognise that something is to be said for education in scientific agricultural methods. Shortly, then, co-operation is an invaluable prelude to the advancement of agricultural education. If they would get hold of that fact, then they could with confidence go to that very large body of men who do not understand co-operation at all, and point it out to them. A gentleman who had a wide knowledge of this subject and who was interested in agricultural education had put it to him and wished to consult Mr. Harris on the point, that it might be possible and after all advantageous to start co-operation first, and then go with education afterwards.



HON. W. F. CLAYTON, M.L.A.
Late Minister of Agriculture.

Hon. W. F. Clayton.

LATE MINISTER OF AGRICULTURE.

IN the *Journal* have been published portraits and short records of Mr. Edward Ryley, Mr. F. A. R. Johnstone, M.L.A., Hon. H. D. Winter, M.L.A., former Ministers of Agriculture, and to-day we have the pleasure of dealing similarly with the Hon. W. F. Clayton, M.L.A., the fourth Minister of Agriculture since the Ministry of Agriculture was instituted in 1897.

Mr. Clayton was born and educated in London; he came to the Colony in 1876 and took employment under Sir Liege Hulett. In 1878, in partnership with Mr. C. Ashwell, a farm was acquired and arrowroot and mealies were cultivated. Among the mealies were planted a few tea trees, and, as the seed became available, a tea plantation was begun. Under that class of crop he has to-day a large area. Later, in connection with his cousin Mr. G. A. Clayton, he started the Glenwood tea estate. After dissolution of the partnership the estate was sold to Messrs. J. L. Hulett & Sons, Ltd. Also, with Mr. Ashwell, he opened out the Fawsley Park estate, and on dissolving the partnership retained the original estate, "Island Farm," where he still resides. The new plantation was taken over by Mr. Ashwell. "Island Farm" is well planted with eucalypti, casuarina, etc., a cypress avenue being particularly beautiful. There are large orchards of citrus and other fruit trees. From the house there is a fine view of the Umvoti Valley and the river from which it takes its name. Up the valley was the scene of the fighting with Messeni. Altogether Mr. Clayton has been engaged in agriculture for 28 years.

Almost since his arrival in the Colony he has been associated with politics. In 1901 he was elected to the Legislative Assembly, and in 1903 became Minister of Agriculture. Among the more prominent features of his Ministerial work may be mentioned the following:—

Opening out of the Cedara Experiment Farm from its second year.

Erection and opening of Cedara School of Agriculture.

Starting of stud stock at Cedara.

Obtaining co-operation of neighbouring Colonies with regard to destruction of locusts.

Passing of Plants' Diseases Act, Burrweed Amending Act, East Coast Fever Act, Scab Amendment, Agricultural Development Act, etc.

Instituted the Land Board; opened up Winterton—30 settlers; opened up land in Zululand—some 170 farms allotted, and concluded arrangements for central sugar mill. Arranged for curing tobacco at Weenen. Arranged for Natal exhibits to South African Produce Exhibition now being held.

Held East Coast Fever in check until the rebellion caused quarantine regulations to be broken through.

On retiring with the Smythe Ministry in November, 1906, Mr. Clayton was presented with an address from the Staff warmly acknowledging the cordial relations which had existed during his tenure of office.

The following article on the beginning of the tea industry in Natal was contributed by Mr. Clayton to the *Journal* in May, 1898:—

“ORIGIN OF THE TEA INDUSTRY.”

As March, 1898, may be called the coming-of-age of the Tea Industry in Natal, it is not inappropriate that a few words should find a place in the columns of the *Agricultural Journal* of the Colony regarding its past history, its development or growth, its prospects, and the *modus operandi* by which the manufactured article is produced.

I call it the “coming-of-age,” because it was in March, 1877, that the seed was landed from which, practically, all the tea estates in the Colony have had their beginning. Not that the first plants of all were grown from this seed—for, I believe, that somewhere in the forties these were introduced from Kew by the late Mr. Plant, and located at the Upper Tongaat. Later on, too, the late Mr. Geo. Jackson, of Greenwood Park, grew a little tea of the China variety, and, I believe, sold a small quantity, but one can hardly call it a commercial venture.

Still, I suppose, these experiments served to establish the fact that the plant would thrive in the climate, and the larger and more important consideration as to whether it would grow to *pay* was left for others others to solve.

It is, I believe, generally admitted that, to be a success, a colonist must be a man of resource. Failure in one enterprise must not mean extinction, but renewed energy in a more promising direction. One has only to look at the prominent public men of Natal to find abundant evidence of this. Merchant becoming farmer, storekeeper becoming lawyer, and so forth; the moral being that the true colonist is a man of parts and not likely to be beaten. Thus it has come to pass that as one industry has failed another has sprung up phoenix-like from its ruins. I make bold to say that, had not the coffee enterprise proved so disastrously short-lived in Natal, the heading of this article would not have been written. But, alas! King Coffee died, and though Queen Tea came to take his place there are many who liked the old chap best.

It was, I think, early in 1876, that, through the instrumentality of the Lower Tugela Division Planters' Association, under the chairmanship of Mr. Hulett, the Government consented to defray the cost of transport of seed from Calcutta to Natal. The late Mr. James Brickhill, of the Natal Bank, was enthusiastic regarding the venture, and, what was more to the purpose, was able to render valuable assistance. Possessing friends at Calcutta, he requested them to procure seed of good *jat* or quality, and these, planted in boxes, were placed on board the Indian immigration ship “Umvoti,” carefully watched, watered, etc., by Captain

Reeves, and eventually reached the wharf in capital order—most boxes having a few young plants already springing into leaf.

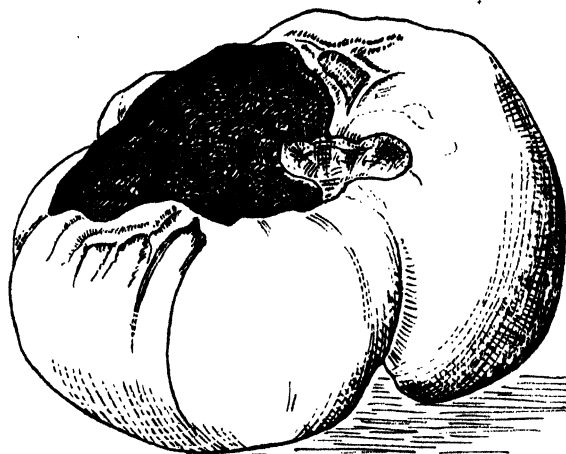
I was at Kearsney when the seed arrived there, and can quite vividly recollect the excitement and curiosity exhibited when it was handed over by Mr. J. M. Cooke (now of Goodricke, Laughton & Cooke), then a planter, who had kindly endured the discomforts of a wagon trip to Durban to secure proper care for the treasured seed.

Next came the distribution among the various planters, in proportion to their varied subscriptions to cost, and then placing of the seeds in nurseries. Messrs. Hulett and W. B. Lyle, sen., appear to have been the only two who "went into the thing" on business lines. Naturally, after so long a journey through the tropics, in a sailing vessel, even with the greatest care, a large quantity failed to germinate; but Mr. Hulett, the most successful, managed to rear and establish in his first field about 1,200 healthy plants, in 1878. These, by the way, are there to-day, as flourishing as ever. And now ensued a period of waiting, for all concerned, until the young trees yielded seed to extend operations, they being meanwhile carefully tended and cultivated, but not pruned—seed, not leaf, being the *desideratum*.

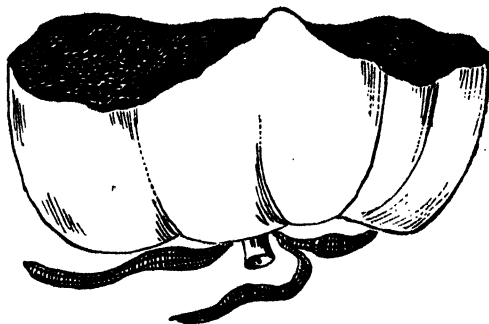
Gradually the acreage grew, and at last the time came when "plucking" could commence. In 1881-2 the first "crop" was manufactured, reaching the vast total of 545lbs., the whole of which was purchased by Mr. R. Jameson, to whom thus belongs the credit of first introducing the product to the consumer. The introduction was a success, and the youthful *débutante* speedily became popular.

Looking back, after a lapse of twenty years, when the aim is to get rid of as much blossom as possible at pruning time, in order to reduce to a minimum the quantity of seed drawing upon the resources of the tree during the flushing season, it seems almost ludicrous to remember how valuable it was then. The writer well remembers being allowed, as a favour, to gather, or glean, the fallen seeds from under the trees, obtaining, perhaps, $\frac{1}{2}$ to 1 per cent. of plants therefrom. This will show that the enterprise was necessarily very slow of development at the onset; be it recollected also that the pioneers, with the exception of Mr. Brickhill, who made it his hobby, were men who had just been exceedingly hard hit by the failure of coffee, just when they had put all their capital into plantation and machinery. It speaks well for the energy and resource, before alluded to, of these men that they were able to carry their enterprise through to a successful issue.

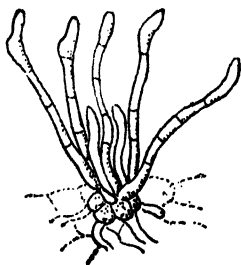
Before seed was available for distribution, there were others who realised the possibilities lying ahead, and the writer and Messrs. Robbins and Ritchie, of Umhlali, commenced to plant as soon as possible, followed shortly by Messrs. Hindson, Balcomb, Thring, Peachey, and others; so that, in about ten years from the raising of the first plants, nearly 1,000 acres have been planted, all derived from the small shipment by the "Umvoti."



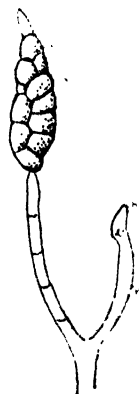
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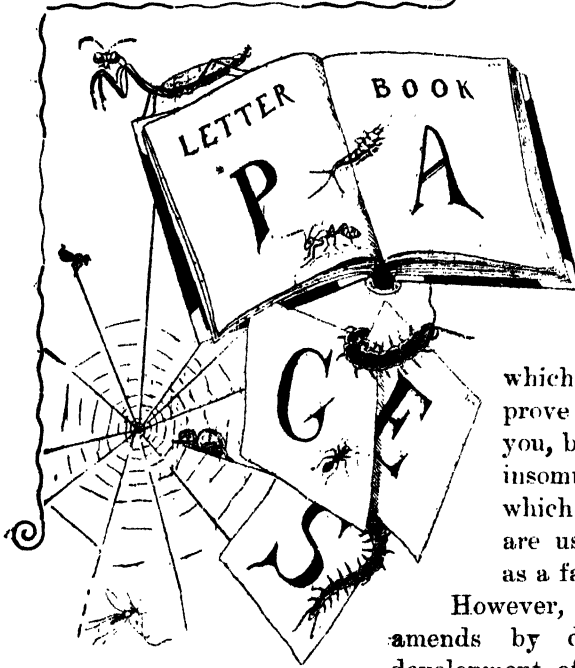
PLATE I.

TOMATO ROT.

- 1 Tomato attacked by Tomato Rot.
2. Tomato collapsed from attack of Rot.
3. The fungus plant causing Tomato Rot, highly magnified.
- 4 A stalk of the fungus plant carrying a spore or seed, highly magnified (after Galloway).

Tomato Troubles.

Office of the Government Entomologist,
Pietermaritzburg, Natal.



DEAR SIR,—

The specimens of Tomato plants and fruits accompanying your letter of the 12th instant, provided quite a collection of insect and fungus pests.

I do not suppose, for a moment, that the interest which these were to me will prove of much consolation to you, but that you must forgive, inasmuch that those things which particularly interest me are usually troublesome to you as a farmer.

However, I will endeavour to make amends by describing to you the development of the fungi and the life cycle of the insects affecting your plants, and then enumerating the methods to be adopted for their prevention, or, where already present and doing mischief, the treatment to be followed out for their suppression.

TOMATO ROT.

(Plate I., Figs. 1—4.)

The specimen fruit which you send is suffering from the attack of the Tomato Rot (*Macrosporium tomato*)—to give it the name by which it is known to science. This fungus disease makes its appearance as a rule at the apex or flower-end of the fruit, when from one-half to two-thirds full grown. This spot is susceptible to attack because it affords the most sheltered situation upon the surface of the Tomato, for the propagation of the spores or seed of the fungus-plant (Plate I., Fig. 4), which give rise to the disease.

This fungus is a wound parasite, and the malady may appear on any part of the fruit where the skin is cracked or even minutely punctured.

Whilst the berry is most frequently attacked, the disease is sometimes present upon the stem and leaves.

The first warning of the trouble is a small, black spot, which starts either round the remains of the style, or a little to one side of it. This, whilst rapidly increasing in size, still retains its original and more or less circular outline, as shown in Fig. 1, Plate I. The dark-coloured roots of the fungus develop rapidly in the tissues, and, as the cells are destroyed, the diseased area first sinks a little below the surrounding and healthy surface. As the disease progresses, the tissues of the tomato collapse, the top of the fruit becoming much flattened, because the fungus generally extends squarely across the berry, from side to side, as shown in Fig. 2, Plate I.

In the latter stages of the disease, the surface of the fruit assumes a black, velvety appearance; and, finally, the entire fruit becomes shrivelled and dried up. The velvety clothing of the diseased area is due to the growth and fruiting of the fungus parasite, which sends out innumerable shoots of microscopic size, similar to those shown in Fig. 3, Plate I. At the apex of each of these shoots compound spores develop, and one of these is shown, very greatly enlarged, in Fig. 4 of the same plate. These spores part from the stems to which they are attached with remarkable ease, and are blown about in millions, settling upon the plants, and causing fresh outbreaks of disease.

The warm, moist weather experienced during the present summer has furnished ideal conditions for the development and rapid spread of the disease.

TREATMENT.

Before telling you anything about the measures of control to be adopted, I must first of all remind you that "Prevention is better than cure," an old adage particularly applicable to this case and, in fact, to all plant diseases of fungus origin.

Professor Bailey, in discussing 'Tomato Rot, says: "The small cherry and plum varieties are not attacked, and the old angular sorts are comparatively free. Training of the vines so as to admit of plenty of light is also useful."

Given suitable soil conditions, the great point to be observed is to train the vines to stakes, pruning them lightly so that plenty of light and air may be admitted. Plants so trained and pruned do not favour the development of the fungus as much as those which are neglected and allowed to run along the ground, and for this simple reason; by the admission of light and the free circulation of air among the plants, they dry off more quickly after rain or heavy dew, and thus the conditions necessary for the development of the disease are rapidly eliminated. Furthermore, should plants become infected, they will admit of ready and more thorough treatment.

When spraying is resorted to, Bordeaux Mixture should be the agent employed, applications being made at intervals of a week or ten days, until no further infection is feared. Generally speaking, in spraying tomatoes, it is advisable to combine with this fungicide some insecticide,

such as Paris Green or Arsenate of Lead, and thus meet the attack of any chewing insects which may be present.

If your varieties are at all susceptible to this disease you will find that repeated sprayings with either Bordeaux Mixture or Ammoniacal Carbonate of Copper as a preventative will resolve itself into a very paying proposition.

Soil conditions have an important bearing upon the successful culture of tomatoes, more especially as regards their susceptibility to diseases of fungus or bacterial origin, and their resistance to such.

The heavy use of stable manure, so that the soil contains fertilising matter in excess of the demands of the plant, especially if in a state of active decomposition, greatly aggravates disease, and tomato plants are more subject to blights on an ill-drained soil than most other plants.

TOMATO LEAF BLIGHT.

You will have noticed that one of the plants which you sent me, besides being infested with the bug to which you draw my attention, is suffering from a disease somewhat similar in appearance to the Potato Blight (*Macrosporium solani*) with which you are so familiar. This is the Leaf Blight of the tomato, and is frequently met with here in Natal. The specimen which you submit very clearly shows the effect and appearance of the disease. Brown, felted spots appear on the under side of the leaves, as the first manifestation of the disease. These, of irregular size and appearance, gradually spread, whilst, at the same time, corresponding areas on the upper side of the leaves assume a yellowish colour.

As the disease progresses, the affected parts become dark brown to nearly black in colour, and the finale is seen in the complete shrivelling and drying up of the foliage, so that nothing but the naked stems of the plants are left.

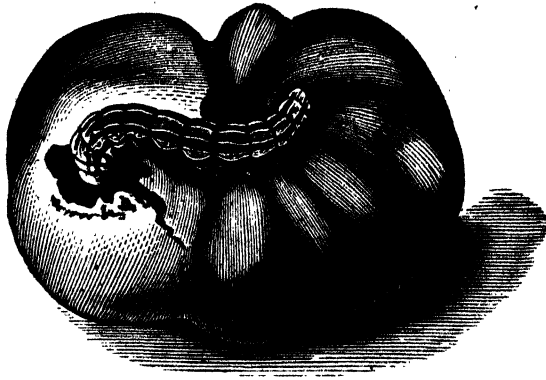
This effect is due to the breaking down and destruction of the cellular tissue of the leaf by the mycelium or root system of the fungus, which has nourished itself thereupon.

The spots owe their origin, in the first place, to the germination or growth of a single seed or spore of the fungus, the root of which penetrates into the leaf through one of the numerous air-pores; and, long before they have become of any remarkable size, each fungus plant, which has so arisen as a parasite upon the foliage, is producing countless spores, through whose agency the infection is spread further afield.

Blackish stripes are often present on the stems of the diseased plants.

TREATMENT.

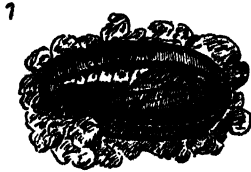
You should endeavour to prevent the appearance of this blight by frequent application of Bordeaux Mixture or the Ammonical Copper Carbonate solution. You are well acquainted with the preparation of



1.



3.



4.



5.



2.

PLATE II.

TOMATO WORM.

1. Tomato Worm attacking fruit.
2. Eggs of Tomato-worm Moth (a) Viewed from above; (b) Side view (highly magnified).
3. Full grown caterpillar (natural size).
4. Chrysalis or pupa in earthen cell or cocoon (natural size).
5. Adult moth (natural size).

Bordeaux Mixture, but you may not be so familiar with the Copper Carbonate spray, so I am giving you the recipe here.

Copper Carbonate	5 ozs.
Ammonia (Strongest Liquid)	3 pints.
Water	50 galls.

Mix the Carbonate of Copper into a paste with a little water. Add the Ammonia, and pour the resulting blue liquid into fifty gallons of water.

This is, as you see, a much more easily prepared spray than Bordeaux Mixture, but I myself much prefer to work with the latter.

Up to the present, I have been discussing the fungus troubles of your plants, and, although I have only mentioned two of these, you must not imagine that these are the only diseases affecting the tomato, as there are a number of others, including two of a bacterial nature, which are capable of doing serious injury. However, as I have not yet met with either of them in Natal, no object will be gained by discussing them here.

TOMATO INSECTS.

We now come to the insects attacking the tomatoes, and of these you furnish two examples on the plants you send.

TOMATO WORM.

Heliothis armigera.

(Plate II., Figs. 1—5.)

The caterpillar you observed eating into the fruit of the tomato is shown in Plate II., Fig. 3. It is from one to one and a half inches in length, pale green or dark brown in colour, and characterised by stripes of a darker colour running the full length of the body. This is the larval form of a moth (*Heliothis armigera*), an insect notorious for the damage which it does to cotton in America, where it is known as the Cotton Boll-worm, and under which soubriquet it goes the world over. Its host-plants are many, and, besides being quite common on the tomato, it will be familiar to you as the Striped Beard-grub of the mealie (of which pest you sent specimens last year).

Plate II. illustrates the various stages of the insect, from the egg to the adult. Fig. 2a shows the aspect of the egg when viewed from above, and 2b is a side view of same. These eggs are laid by the adult moth on the leaves of the host plant, and in the course of a few days hatch small caterpillars, which grow to the size of that shown in Fig. 3. It is during this stage of development that it is so injurious, and it is seen eating into a tomato in Fig. 1. On reaching full growth it enters the ground, there pupates in an earthen cell or cocoon (Fig. 4), and from this chrysalis ultimately emerges the moth shown in Fig. 5.

TREATMENT.

The latest experiments, carried out under the direction of Mr. C. P. Lounsbury, Government Entomologist of Cape Colony, go to show that

the use of Arsenate of Lead has been attended with the most success when directed against the larvae in the fruit. This is, as the name implies, an arsenical poison, but no danger of burning the foliage—as is the case when free arsenic is employed—may be feared. It should be applied at the rate of three pounds to fifty gallons of water, and I would recommend that Swift's brand be used. This is a most desirable insecticide and one which I would like to see more generally in use for plant-eating insects, such as caterpillars, beetles, etc. Paris Green may also be applied, but, upon the whole, it is preferable to use the Arsenate of Lead.

TIP WILTING BUG.

The second insect pest is a plant-bug. A troublesome and ever-spreading weed, the tree tobacco, probably *Solanum gigantium*, is well known to children about Maritzburg as the "bug plant." This because this species of bug breeds upon it in enormous colonies. Indeed, the bugs are so numerous that they completely clothe the succulent stems for 20-30 inches. The creature, despite its abundance, does not seem to suffer from any natural enemies, nor does it harm this host particularly. It has always seemed remarkable, during the several years that this creature has been under casual observation, that it had not taken to cultivated plants. Lately, however, attention has been drawn to it several times, upon both tomato and chilie plants. In both instances the bugs damaged the plants, and were particularly mischievous in their effects upon the latter. What renders the observation more remarkable is that, in the case where the chilies were suffering so severely, they were entirely surrounded by tomatoes, which were free—an indication of the preference of the insect for chilies over tomatoes.

TREATMENT.

Hand-picking is the most practicable method of dealing with this pest. It should be done in the early morning, when the insects are lethargic in their movements, and may easily be caught. Quite the simplest method of killing the bugs is to provide a tin partly filled with water, on the surface of which a film of paraffin or some other oil is floated. When dropped into this, the oil enters through the several breathing holes or stigmata of the body, and kills the insects readily. Whilst hand-picking the insects, a good look-out should be kept for their eggs. These are laid in clusters, upon the under surface of the leaves, and much resemble a group of small, dark-brown, glass beads. The leaves carrying the eggs should be picked off and dropped into the tin, along with the bugs.

I think that I have now given you all the information which you require, and conclude with the assurance to you that it is always a pleasure to advise you on these matters, as far as lies in my power.—
Yours faithfully,

ALBERT KELLY.

Co-Operative Banks for Agriculture.

WITHOUT credit, business relations are practically non-existent. Credit is the bond that holds together the whole fabric of modern trade and industry, and renders possible business enterprises on every scale of magnitude. Unfortunately, however, whilst the man in town is able to command credit much or little according to circumstances, he of the soil is handicapped by force of circumstances from participating in that help to enterprise and successful business.

The chief difficulty that has had to be overcome in organising some suitable credit system for the agriculturist, has been the fact that short credit, which is so largely the rule in ordinary business relations, is of little or no use to the farmer. The farmer, from the very nature of his business, requires extended credit; and money obtained for long periods from the ordinary banks is too dear for the farmer's requirements. In addition, he is, ordinarily, not in a position to command credit: he has nothing to offer as security such as a banker would be willing to recognise.

Realising the position of the farmer in this respect, several successful attempts have been made to ameliorate conditions and provide credit on easy terms by the establishment of various forms of agricultural banks. Raiffeisen led the way, and he is justly regarded as the father of the movement. Others have followed—some adopting the Raiffeisen principle, others instituting schemes of their own, according to the needs of their respective countries. In England, Mr. Henry Wolff may be regarded as the leading authority on all matters connected with agricultural credit; and his book on agricultural banks is the leading work on the subject. A pamphlet by him, entitled "Co-operative Banks for Agriculture," has recently been issued by the Agricultural Organisation Society of Great Britain. In the direct, pithy style that characterises it throughout, it sums up in a few words the position of the agriculturist in regard to credit. "Agriculture, both small and great," says Mr. Wolff, "though plainly requiring working capital, such as credit can supply, is not in the same advantageous position as other callings to command credit—in the first place because it turns over its money very slowly, and accordingly requires its credit for very much longer than what ordinary dealers in money like to part with it for; and, next, because the method of agriculture are distinct from those of all other callings, and the security which agriculture has to offer, though ample in itself, is not such as a commercial banker could readily appreciate and honour."

Continuing, Mr. Wolff draws attention to the advantages of the co-operative credit system. Co-operative credit on a share basis, he says, has this advantage, that it can be applied *anywhere*. Unlimited liability,

which is the mainspring of the Raiffeisen system, is not a suitable form for carrying on any considerable business, being applicable only to very restricted areas and small purposes, under restraints which in a larger sphere would become hampering.

On the other hand, unlimited liability banks render it possible to reach lower levels of poverty and distress, in addition to their educating and character-forming influence.

But without funds, Mr. Wolf says, "even the most excellent machinery would be useless." Continuing, he says: "Funds, evidently, there must be. But I am a little troubled at finding you rather habitually seeking for them in quarters to which one would think that our boasted British self-reliance would turn only after discomfiture elsewhere. You ask for private patrons' largess, for Government subventions, for advances—appealed for under cover of foreign precedents, which are, in truth, no precedents at all—from the Savings Bank. But why should you go down on your knees at all to the Chancellor of the Exchequer, begging him for favours, when you have absolutely the same facilities for obtaining savings bank money within your own reach? It is like a child crying to its nurse in the next room for milk which is actually placed before it on the table. Why is it necessary that the savings deposits that you want should laboriously circulate through the coffers of the National Debt Commissioners before reaching you—which, by such circuitous route they never will? You have better opportunities for collecting that money at your command than the Chancellor of the Exchequer, and your own interest, as well as the task which you have set yourselves of raising your people, at any rate, materially, demand that you should use them, and promote thrift. Mr. Gladstone has frankly owned, after he had carried his point, that in introducing his two Savings Banks Bills, which, as Acts, secure to the Chancellor of the Exchequer the full disposal of all savings bank money, he was pursuing an officially selfish object—about which he was afraid to be questioned, lest it should be revealed—namely, to give the Chancellor of the Exchequer 'a strong financial arm,' and to make him 'independent of the money market.' That is precisely what you want. You want the money. Why not collect it? You have greater advantages than the Exchequer. You know your people, and are known of them, and trusted by them as being men of their own choice.

THE SECRET OF SAVINGS BANK SUCCESS

is, as the Nestor of the great trustee bank of Glasgow, Mr. Meikle, has deposed, 'facilities.' Being on the spot, you are in a better position than the Government Savings Bank to provide such. You know what are the most convenient hours, the most appreciated methods. You can send round collectors to snatch up pennies as they come in, emptying the stocking and the drawer, and as Schulze Delitzsch said, that it was your duty to do, sweeping the district bare for your benefit of all its spare

cash. Having more remunerate employment for your money, you can yourselves pay a higher rate of interest. You do not seem to have any idea what a marvellous gift co-operative banks have of ingratiating themselves with local people as savings banks. But that is what forcibly strikes everyone who visits them abroad. Therefore Lord Avebury was quite right when, in 1887, he recommended them to the House of Commons as model receptacles for savings. You may observe it at their very first start, in their most feeble infancy. In Cyprus a friend of mine has started fourteen village banks, as nearly Raiffeisen as he could make them under adverse circumstances, in as many wretchedly poor villages. Within one year their savings deposits averaged £200 per bank. The collective amount represented more depositors, and totalled up to a higher figure than all that the far more pretentious Government Savings Bank, working over the whole island, could boast of after five or six years of its existence. In India the same Registrar, under the Act of 1904, who about a year ago advised me that among the wretchedly poor rayats of his Presidency savings deposits were absolutely out of the question, now states in his last annual report that savings deposits are coming in nicely, that the members of his banks have bound themselves by rule to deposit each year so much for every rupee rent paid, or for every plough employed. 'If this continues,' so he adds, 'and there is every prospect that it will, the problem of financing these banks will settle itself.' Let me tell you of Germany. The great 'Imperial Union' of agricultural co-operative societies began, like yourselves, by looking for assistance from the outside. The Government came to its assistance, endowed a State central bank with £2,500,000 of money, directing it to deal out advances freely at less than market rate. The result was that the banks grew up very epiphytes, accumulating little capital of their own, as a report presented to our last International Co-operative Congress has shown. However, the State bank could not go on paying out money at less than it cost it to buy. It became more exacting. It was met with an indignant outcry, of which I was a witness. However, the lesson was taken to heart. The banks laid themselves out for collecting savings, and their annual takings of such now amount to

£5,000,000 IN EXCESS OF WITHDRAWALS.

That is for two Unions, numbering about 1,750,000 members. The managing director of the State Central Bank, which acts as banker for many co-operative societies and some savings banks, stated about two months ago that he then held on behalf of such bodies no less than between 80 and 90 millions sterling of savings deposits. Yes, gentlemen, these accumulations of co-operative cash run into money! Some eighteen months ago Mr. Chamberlain spoke in a lamentable voice of £100,000,000 a year that he would like to have to distribute in wages among British working men, as if that were a far-off achievement. But £100,000,000 is just the sum that about 900 co-operative banks of the Schulze-Delitzsch

type—including some very large ones—keep circulating year by year in fructifying employment. In the last full year reported upon (1905), 921 such banks among them lent out £150,000,000. At least one-fourth of that goes to agriculture. Do you know how the German Raiffeisen banks stand with regard to their central bank? You will say that they are deeply in debt to it. They have, collectively, a goodly sum standing to their credit. A little while ago it was £700,000. It is they, at present, who supply their central bank with funds, not *vice versa*. And where do those funds go? Please mark this! To the host of agricultural productive societies, which profitably convert agricultural produce into more marketable and more valuable commodities, and to which in great part German agriculture owes its improved condition. Is there not a valuable hint in this for our Agricultural Organisation Society? It is the banks which find the money for establishing co-operative dairies, beetroot sugar factories, potato distilleries, sourkroot factories, jam and pulp factories, vintries, granaries and the like, repaying themselves out of the produce. In respect of dairies, the tax levied upon produce not long ago was, and probably still is, a farthing per litre (½ths quart) employed. All this, and the large posse of supply and other co-operative societies German agriculture distinctly owes to the banks. Thirty-seven years ago, when I returned from Germany, having farmed there some land that I had bought during several years, there were as good as no agricultural co-operative societies in Germany. We had some few here, about nine county societies for the supply of manures, and the Agricultural and Horticultural Association in its beginnings. On the strength of their results I wrote a little article, which I thought would be useful, and which the Prussian Ministry of Agriculture gladly inserted in its official organ. But the result was nil. Some years later the banks came on the scene, and as

BY A MAGIC TOUCH OF A MODERN MIDAS THE LAND BECAME FERTILISED WITH GOLD,

quickly covering itself with agricultural co-operative societies of all sorts. There are more than 20,000 such societies of an agricultural character only, among them nearly 14,000 banks. The co-operative dairies numbered in October, 2,950. We have 14. I have seen steam threshing machines for common use belonging to men who had never been called upon so much as to put their hands into their pockets for even a stiver to purchase them with. The bank had bought them, and recovered the value out of their own proceeds.

“Do not we want something of the same sort? It can house us, too, and cut up estates into small holdings. There are co-operative societies which do that to perfection.

“The collection of savings deposits ought, therefore, to be the main supply of your funds, the pillar upon which you rest your system. In making it such you will be rendering a great service to the country as

well. However, no bank can expect to start with a large supply of such deposits, and there are sure to be times when, even if it have such, it will require to make a draft upon other capital."

As has been pointed out, the farmer is not, as a rule, in a position to command credit, from the fact that he has little security recognisable as such by commercial bankers. In agricultural co-operative credit banks this difficulty is easily overcome. "Security" does not necessarily mean so much money invested in Consols," Mr. Wolff reminds us, "but a certain guarantee that you can give to your lender (who may, of course, be a depositor) that he will be repaid"; and, further, he says: "Personal security is by far the most convenient for business purposes, and also the most educating. In a co-operative society you have the very best means at your disposal for giving and obtaining security of a personal sort. For you have a selected membership to begin with, selected by yourselves, with the very object of credit in view, and if you only devise appropriate machinery, by means of the touch subsisting among members, and the hold which every member as a class-mate and neighbour has upon the other, and of members' power of watching the employment of each loan, you may be sure that you will adequately secure yourselves against anyone that borrows from you; whereas, by pledging to everyone who lends to you your collective share capital, or in one case even your collective possessions, you provide ample security for him. It is the creation of an intermediate body, standing between borrower and lender, bound entirely to the former by its common interest, yet bound also in each single case, in virtue of the liability of everyone engaged, to hold the debtors to their duty, on which really the whole structure rests. It is the system of Scotch cash credit carried very much further and democratised. Scotch cash credit, which has done such wonders for Scotland generally, and specifically for Scotch agriculture, was, in an inquiry held by a Lords' and Commons' Committee in 1826, explained to be safe, because to every borrower there were three or four sureties, liable for him and acting as sentries to him, closely watching him and holding him to his obligations. In co-operative banking you have the same sentries, and, in addition, you also have the security of the entire society."

With such security there is no risk. It is personal security; and its moral influence upon members of such a bank is inestimable.

Mr. Wolff's interesting pamphlet ends: "When your banking has grown strong it is to be presumed that you will have

YOUR OWN CENTRAL BANK,

formed by the banks themselves, in which surplus and want of various banks will balance one another, and which, on the strength of your united security, will be able to tap the money market.

"But for starting, probably a guarantee will always be best, just because it is a guarantee and not a loan, which means that it places the borrower's liability foremost and the guarantor's only second. The dan-

ger to these banks to be apprehended from all financial help given is that such help may become a gift, and so blunt the sense of responsibility which it is your interest to keep keenly alive. A lender may reconcile himself to the loss of money already dealt out. A guarantor will want to know why he is called upon to pay before parting with his money. And this is most useful for the bank itself. It may be made to anticipate that Union inspection upon the utility of which I have already dwelt.

"Only, if you have guarantors—who need not necessarily be members of the particular bank, but may very well be outsiders, forming possibly a Guarantee Committee for some distinct district—do not, as you value your bank, make the guarantee a pretext for asking for privileges. There is one privilege which you have a right to ask for and which you will benefit the bank by insisting upon. That is full control, examination of the books, restraint upon unsafe action. The more important your guaranteeing body is, the more effectively will it be able to apply the control of checking, which is useful for the bank because it is essential for its success that in it everything should be kept strictly business-like. That is why I suggested guaranteeing committees, which might employ trained inspectors. An Endowment Society formed by independent capitalists might render the same service.

"I purposely do not call it a Central Bank, because for a considerable time there could not possibly be any banking for it to do. Money would be going all one way, and to call an institution under such circumstances a Central Bank might be to mislead people, and might very possibly damage the movement. There can, on the other hand, be no harm in a Central Endowment or Advance Society, provided that it is kept fully business-like and strict in applying inspection and control, and that it makes it its avowed aim, in due course, by the admission of banks as shareholders, to convert itself into a bank of banks. There is danger in mere patronising endowment which wants to be guarded against.

"I think I have shown that co-operative banks may be richly useful, that they are not difficult to establish, and that they may be made absolutely safe. As a means of making them so, let me sum up in a few words

THE MAIN POINTS OF YOUR TASK.

You have to find security, and that security must be absolute; to provide it you must submit to any engagement which may prove necessary. You substitute service, vigilance, painstaking control for a tangible pledge. Your collective liability is your creditors' security. Your control is your own. You cannot get away from these fundamental conditions. *With* them you may accomplish anything. The possibilities of co-operative banking are, as the late Ernest Brelay has put it, "illimitable." But break away from principle, take liberties with necessary safeguards—which it is very easy to do—and your substantial structure becomes a mere house of cards; the treasure for which you look, delusive rainbow gold. In the interests of British agriculture, which wants a lift, I hope

that much, very much, will now be done for the promotion of co-operative banking, on sound, approved, self-help lines, and if that is done I do not hope, I am confident, that your action will be crowned with rich success, and that you will be found to have rendered an invaluable service to our native agriculture."

Readers of the *Journal* interested in the formation of agricultural banks are referred to the article on "Agricultural Credit Banks," by Mr. E. T. Mullens, in the October and November issues of the *Journal*, 1905; also to Mr. Wolff's work, "Agricultural Banks: their Objects and Uses." The Department has ordered a number of copies of Mr. Wolff's book, and intimation of their arrival, and terms of disposal, will be given in the *Journal*.

Age of Cattle at Shows.

NOTHING casts a greater cloud over the proceedings at shows than the suggestion that there has been something doubtful in the get-up of an exhibit, or that there has been a false statement made in regard to age or date of shearing, etc. Nothing is more horrible than for an exhibitor to be placed in a position of attempted deception, and it is not to be wondered that he will raise Cain in the endeavour to refute all unjust accusations. Fortunately, among the large number of shows held throughout Australia, underhand practices or false statements are hardly ever heard of, but nevertheless it is important that agricultural and pastoral societies should take every precaution to state the conditions pertaining to each class so that there can be no ground for the slightest doubt or complaint. At the last Sydney Royal Show trouble occurred in the fat cattle section, owing to the ages of some of the entries being disputed, and as a result we are glad to see that special regulations have been drawn up to prevent the occurrence of this in future. The age of all cattle is to be computed up to the 1st of March, 1907, and full pedigrees must be given on the entry form, except in regard to grade dairy cattle and fat cattle. Exhibitors of fat cattle must state the name of the breeder, where the cattle fattened, and what food they have been kept on during the year, and they must declare that the animals entered have not appeared in the same class at any previous show of the R.S.A. of New South Wales. A very satisfactory and important by-law is that instructing the judges to refer all cases of doubtful ages to the stewards before the awards are made, and the stewards may then call in the society's veterinary surgeon to report right away. The matter will then be settled by the council, whose decision will be final. We do not anticipate any future trouble of this kind, but we commend the adoption of regulations for so promptly dealing with disputes that may arise. It is most unsatisfactory to postpone the inquiry till the show is over, because the wrong exhibits have posed as prize-winners during the currency of the show, and the rightful competitor has suffered an injustice. The time to deal with any doubtful entries is directly suspicion arises, before any awards are made, even if the progress of judging is delayed in consequence.—*The Pastoralists' Review*.

"Horsesickness."

BEING THE SUBSTANCE OF A LECTURE ON THIS SUBJECT
DELIVERED TO THE INANDA AGRICULTURAL ASSOCIATION.

By H. WATKINS-PITCHFORD, F.R.C.V.S., F.R.S.E.

IN dealing with the history of South African horsesickness we cannot, as with such diseases as tuberculosis or rinderpest, avail ourselves of the observations and works of men of bygone ages, our earliest disease-history being comparatively recent and dating only from the earliest decades of the eighteenth century. The first record of the existence of the disease in South Africa is in 1719, when it seems to have assumed a spreading or epizootic character and swept over Cape Colony, destroying a large number of horses.

It is probable that the disease existed before this, but did not attain any great dimensions owing to the thinly settled state of the country and the consequent absence of the inseparable friend and servant of man the horse, which does not seem to have existed in South Africa before its introduction from Java about 1650 by the Dutch East India Company.

The earliest documentary evidence I have been able to procure as to the existence of Horsesickness in South Africa is contained in a letter written by a Mr. T. Moodie from Fort Beaufort, in the Cape Colony, dated in March, 1856. This gentleman now probably long gathered to his fathers, says in the course of his letter:—

"I have never seen Horsesickness before but often heard of it. In 1839 my father lost upwards of 100 at Groot Vander's Bosch, and in 1819 he also lost a great many. In the year 1801, called the year of the 'great Horsesickness,' I have been told that the whole district was cleared of horses and that it was nearly as bad as 1780."

This letter then affords us a brief glimpse into the past, and is all the more interesting as showing us the difficulties experienced by the South African horse-breeder as far back as the time when George IV. was on the throne.

The horse is, of course, an equine closely allied to the Zebra (with its three species, *Equus Chapmani*, *E. Burchelli*, and *E. Zebra* or *Quagga*, Burchell's and the common Zebra) and South Africa has been, as we all know, from time immemorial the home of this species of Equidae. It seems therefore not a little strange that so closely allied a genus as our domestic horse should have found existence in a natural condition apparently impossible in the Sub-Continent. The laws governing the questions of Immunity and Susceptibility seem at times very strange to us, and an apparently slight racial difference is sufficient often to constitute the impassable barrier. We may ask why the white rat is insusceptible to Anthrax when the brown or black rat readily succumbs, or why the

sheep of Algeria can resist the same disease so fatal to sheep elsewhere all over the world; and many similar seemingly inexplicable problems will confront us on the fringe of the extraordinary complex subject of immunity.

However this may be, we find that the zebra can exist in localities where natural conditions of existence are impossible for the horse, and incidentally it has frequently occurred to me that possibility exists of utilising this natural resistive power of the zebra in the study of the disease horsesickness.

When one considers the apparent absence of natural barriers to the migration of the horse from the northern part of the Continent (where—if not indigenous—the species has at least existed from time immemorial) it does not seem irrational to suppose that the disease which we know as Horsesickness has been responsible for this repression of extinction of the wild horse from South Africa.

Since the time of the first known introduction of horses by Europeans, now some two hundred and eighty years ago, the disease has levied a heavy annual toll upon South Africa, in some years mild in its incidence and in others denuding a whole country-side of its horses. Edington (quoting doubtless from official papers) cites an outbreak of this latter sweeping form of the disease which in 1854 destroyed 64,858 horses in Cape Colony alone.

Of the distribution of the disease throughout the whole of the African Continent south of the Equator there seems no doubt.

Some years ago I was able to obtain through the help of our Colonial Office a number of Consular Reports, showing, on the East Coast, the prevalence of the disease as far north-east as Zanzibar and from S. Paul de Loanda on the north-west.

The Consul General from Old Calabar, which is even north of the Equator, reports the prevalence of the disease “throughout the territories of the Protectorate,” and from Angola the official report states that the disease is “most deadly” and that “horses die shortly after being landed.” Thus we see that a vast tract of country exists in Central Africa from which the natural horse would seem to have been eliminated by some destructive agency, while as we know he can flourish to the north of this deadly zone and in the south the association with man, which means stabling and care, affords at least the possibilities of existence.

From this rapid consideration of the geographical distribution of the disease the transition of thought to climatic influences is natural.

While in regions around the Equator the disease, as we have seen, is active at all times, we shall notice as we come south—that is as we approach more temperate latitudes—to that degree, the disease Horsesickness tends to become periodic or intermittent throughout the cooler months of the year, and as we leave Mashonaland and Matabeleland the country south gradually becomes free from the risk of Horsesickness throughout certain months of the year.

When in Salisbury, Rhodesia, I saw a typical case of Horsesickness in the depth of winter, and was informed by Mr. Grey, then Chief Veterinary Surgeon, that such cases were by no means uncommon. Even in Natal many must have heard of such cases (especially on the milder Coast belt of the Colony), but as a general rule Natal and the Cape Colony enjoy an almost entire immunity during some six months of the year. In fact, it may be laid down in general terms that the disease Horsesickness is connected with the *mean* temperature of the district. Exceptions, of course, occur, but we may say with confidence that the incidence of the disease is greater upon those districts possessing, by their geographical characters, milder and more sub-tropical conditions of climate.

Further than this, abundant evidence is forthcoming as to the intimate connection of outbreaks of the disease during or following seasons of exceptional rainfall. Coastal districts, the Tugela and Umfolosi Valleys, swamps and districts well-watered and wooded are especially liable to its ravages, and the occasional outbreaks on the high veld of the Interior have a direct relation to the rainfall and probably the level of the *subsoil* water.

Humidity and warmth then are accepted factors in the production of the disease, or, if not concerned directly with its production, are at least invariably associated with that sweeping epizootic form of the disease which occasionally devastates our stables.

Most of you gentlemen will, I expect, have heard of, even if you have not personally met, cases of the disease occurring in the depth of winter and in places where conditions of warmth and moisture can hardly be said to obtain.

I think such instances are authentic and would be inexplicable in the absence of our recently attained knowledge as to the length of time the germ of the disease can remain latent within the system of the horse, just, as we all know, the germ of malaria will remain quiescent in the system of man for weeks and months and suddenly spring into active evidence heralded by the well-known shivering and fever.

Cold, exposure, exhaustion and other depleting and enervating causes will often precipitate a smart attack of malarial fever in a person who perhaps *many months previously* had the misfortune to become infected by the disease.

That the germ of Horsesickness can lie dormant in the system of the horse for a lengthy period, longer in fact than the usual period of incubation, I have frequently proved in my experimental work with this disease; and this fact is the more interesting when one considers the usual rapid and certain symptoms produced by the disease when gaining access to the horse's system in the usual way.

This lengthy period of incubation has not, I believe, been noticed before, and I shall refer to this fact again, but as we see it may have some bearing upon the question as to those infrequent occurrences of the disease at other times than in Horsesickness season.

It is not, however, to this or any other of the more speculative and theoretical questions attending the study of the disease that I would ask your attention.

As you know, I have in the past expressed my opinion as to the cause of the disease in the form of official reports, etc., and probably most will have thought over the matter more or less since reading or hearing of these expressions of opinion on my part.

I believe that South African Horsesickness is spread chiefly, if not solely, by means of suctorial insects, and the conclusion that such are flies (and probably mosquitoes) the rapid transmission of the disease would seem to warrant.

To deal with this point first. I will endeavour briefly, and as clearly as I can, to enumerate the possible modes of infection, by which, of course, we understand the manner in which the disease is contracted by horses.

The usual manner of contracting a disease is by contact, *i.e.*, contagion. A very short survey of the disease will suffice to show us that simple contact or association (however close) of a sick and healthy horse does not produce Horsesickness. Examples of this method of infection would be found in rinderpest, small-pox, etc.

For every one instance in which animals in a stable have taken the disease simultaneously, probably five hundred instances could be brought forward showing that horses on either side of the sick animal remained perfectly healthy.

In fact, I am justified in being dogmatic on the point and in saying that Horsesickness is *not transferable* from one horse to another.

Does the horse then pick up the germs of the disease with his food, or water, or does he breathe them into his system as he inspires?

Here we arrive on more debatable ground—ground which as we all know has been very well traversed by lay and professional man alike for some three or four generations past in South Africa.

It is very interesting to refer to a number of conjectures on the cause of the disease which were furnished to the Governor of the Cape Colony in 1855 by various District Surgeons, Surgeons of Regiments quartered in South Africa, and Civil Commissioners. A great variance of opinion is evident. For instance, Doctor Soek, writing from Clanwilliam in October, 1855, states his opinion that the disease is caused by "a deleterious miasma in the air which, being inhaled by the horses, does not cause inflammation and suffocation, but, taken up in the blood and the ramification of the bronchia, acts as a poison by destroying the vitality of the blood." The practical advice given by this writer to prevent the disease is as follows:—"The wild garlic is to be recommended to travellers who travel early in the morning or late in the evening, and especially those passing over low marshy ground, to have a small quantity of the garlic pounded and tied in a small piece of rag and this rag affixed to the bit of the horse."

This suggestion for the prevention of the disease is of more value than the recommendation of Doctor Cooper, of Somerset East, in a letter dated October 5th, 1855, in which the worthy medico advises in all seriousness as follows: "Let the patient be hung up by his hind legs from the beam of the stable three or four times a day for a few minutes so that the discharge from his lungs may run out mechanically."

The general consensus of opinion professional and lay about that period seems to have been that miasma, morbid poisons, sudden changes, poisonous herbs, honey-dew, bad air, oppressive atmosphere, etc., were responsible for the disease, whilst the Staff Assistant Surgeon, writing from Fort Peddie in 1855, states that "cold is the exciting cause of the disease," an opinion which those living on the warm Coast-belt will be hardly likely to endorse.

Bitter and sticky dew mists and an unaccountable prevalence of fine cobweb gossamer on the veld were considered by people of 1855 to be the cause of the great outbreak in that year. A. M. Bayley, writing in 1856, says, "these webs were unusually abundant everywhere in the early part of 1855, and could not fail to attract notice." Such appearances were a marvel to those days long prior to 1855, as far back at any rate as the time of Chaucer, who sang:—

"As some sore wonder at the cause of thunder

On ebb and flood, on *gossamer and mist*,

And on all things, till the cause is wist."

But perhaps the strangest of all strange hypotheses which have been advanced to account for Horseshickness is that which was contained in a letter written by a medical man from Genadendal, in which the disease is attributed "to the atmosphere remaining behind the earth in its rotation." No wonder amidst such bewildering conjectures and theories the pious old Boer shielded himself behind his fatalistic philosophy, and in the frequently devastating epidemics of Horseshickness saw but the chastening hand of Providence.

As we have seen, the disease, by general consensus of opinion, is not contagious, *i.e.*, it cannot be caught by the close contact of a sick horse with healthy ones. Neither is it directly infectious, scattering the germs of the disease about in mangers, horse troughs, clothing, etc., as in the case of glanders. We are all agreed, I think, on these points and confirmed in our scepticism concerning such agencies as spider-web, cold draughts, sudden changes of weather, etc., etc.

There remains, however, among other things, the possibility of the horse becoming infected by ingestion, as we call it, "by something he picks up," either with his food or water, or a something which he breathes into his lungs.

We all of us know the universal theory of the association of *dew* with the disease, some going so far as to attribute to the dew itself the actual production of the disease. I know that this theory is very widely spread, in fact the so-called dew-theory was till very recently held by a

scientific worker in South Africa who, from his lengthy experience and facilities, can bring forward more reasons for the faith that is in him in this respect than probably any other worker with this disease.

The facts supporting this dew theory are briefly as follows:— Practical horsemen have noticed, first, that the more efficient the stabling the greater the protection afforded; secondly, that horses can be safely exposed about the time the grass becomes dry by reason of the evaporation of the dew, and that when the dew is on the grass (*i.e.*, during the evening, night, and early morning), is a time during which the disease is liable to be contracted. During the continuance of wet weather there is little dew and little risk, and several other arguments lend themselves not unnaturally towards the proof of the causation of Horsesickness by dew. Such dew was supposed to be inhaled as the horse grazed among the tufts of grass and herbage, or was swallowed with the food, and it has been frequently suggested in order to account for the presence of the microbe only at certain hours on the ground and herbage, that the dew entangles the microbe which is floating in the air, and this causes its subsistence or precipitation on the herbage, which thus becomes dangerous as it becomes dew-laden.

That such a process as this is impossible, a consideration of the principles of dew formation will show, for, as we know, dew does not fall like rain, but is condensed as it were only upon the actual surface upon which it appears, in a similar manner, in fact, to the moisture which condenses from our warm breath on a cold window pane. The idea, therefore, of falling moisture bringing down the fatal germs and depositing it on the ground is not to be entertained. Besides if it comes from the air in this manner why are not all the horses in the district suddenly affected simultaneously?

I have collected dew in quantities during the dangerous season from localities as dangerous as I could secure, and have not only drenched horses with dew, but have introduced the same directly into their veins—which is the most certain of all methods of producing the disease—but my results have been always, as I expected they would be, entirely negative. I think we must therefore preserve a very open mind towards the dew and remain at least unbiassed against an agent which has been so often accused, until we see further evidence of its innocence.

Is then the evasive and malignant cause to be found in poisonous herbs or roots? I think the owners of large stables in Durban and elsewhere will promptly deny the possibility. Innumerable instances of horses kept strictly on dry food (corn and imported hay) and receiving no herbs green or dried, will be brought forward to prove that infection has nothing to do with poisonous herbs.

Perhaps the drinking water becomes contaminated? Evidence has often pointed to infection occurring when animals were taken to water, but not to any general infection contracted in this way, that is, several horses have drunk at the same spot about the same time, and perhaps

only one has taken the disease; and I may say here that I have a number of instances in which horses have become infected where no water has been given except that which has been boiled and allowed to cool with the cover kept carefully on the boiler during the process to prevent possibility of contamination.

It has been thought by some that the germ may be carried about with currents of air and by wind, and that it may be inhaled and cause infection in this manner, and so account for those sweeping attacks which destroy numbers of horses during a bad season.

Here again, however, the objection is insuperable, for all animals in a stable should be equally affected. Such conditions of infection as above are uniform and general in action, while the contagion of Horsesickness is erratic and uncertain to a degree.

We have, I think, excluded food, water, air, the dew, cold and heat, and other climatic conditions, as also other agencies, whether eaten, imbibed, or inhaled.

There remains then the possibility of *inoculation*, or the introduction of the cause of the disease into the system through a puncture of the skin, such as happens in the infection of the ox by the tick in redwater, or infection of man with malaria, and in numerous other instances of disease production.

I fear I may be deemed to have unduly laboured this point, but I wish to bring before you all the arguments in favour of the disease being produced by or through any of the possible modes and agencies which I have laid before you.

It will be known perhaps generally that I hold the opinion that Horsesickness is produced by the bite of a flying insect, and I was led to attempt a proof of this theory by consideration of the various arguments which we have enumerated.

All of these seemed wanting in some one or other vital particular, and the theory of the insect-production of the disease was forced upon me as much by the process of *elimination* of other causes as by the strong parallel or analogy existing between Horsesickness and human malaria.

Since that time a stronger parallel has arisen in the yellow fever of man (which has been such a dread in the West Indies and elsewhere), and this disease has lately been shown to be due entirely to infection by a species of mosquito. In this disease—yellow fever—the microbe of the disease is too small to be seen even by the most powerful microscopes, and this, as you probably know, is true also of the disease Horsesickness.

If we now consider briefly the possibilities of the disease being produced in the horse by the attack of an insect such as a mosquito, I think we must all come to the opinion that such a means of spread of the disease is probable.

The details of an investigation undertaken by myself with the object of proving the agency of insects in the production of the disease are probably known.

A number of horses were taken from Natal into a locality by repute most deadly for the disease. The experimental camp was placed in the Begamusi Valley, in Zululand, and the deadliness of the locality fully bore out the evil reputation earned by this locality for Horsesickness.

The intention was to maintain certain animals in such condition and amid such surroundings that, while they were protected against the possibility of insect attack, they could at the same time breathe whatever miasma the air might contain, and inhale or swallow any infective dew or herbage which grew in the vicinity, and, in fact, be subject to conditions as similar as possible to the horses surrounding in all other ways except in respect to their protection from flies.

This protection was effected in two ways, first by constructing a light frame-work box, the walls of which were formed of sheets of fine gauze netting (No. 32). Through the walls of this box the contained animal was clearly visible, and currents of air could circulate with the greatest freedom. It is not probable, therefore, that germs which are too small to be seen by the most powerful microscope and which are able to squeeze themselves through the pores of the densest porcelain filters would experience much difficulty in gaining access to the test animal under observation in the gauze box.

I am satisfied, therefore, that the possibility of atmospheric infection were adequately provided for.

Two horses were tethered to posts as close to this box as possible, and these animals, which I call the "control cases," or simply "controls," were subjected to exactly reverse conditions, i.e., they were, in the absence of any protection, liable to insect attack, and received no green food or herbage of any kind, while the earth upon which they stood was well burned over and trampled hard so that no blade of grass was within their reach.

If, therefore, *atmospheric influences* were concerned in the production of the disease all these animals should have been equally infected, if *dew laden grass* or other deleterious green food was concerned, then the horse in the box should alone become infected, and, further, in case it should be urged that the *drinking of natural water* caused the disease, the control animals receiving the dry food received also nothing but boiled water, while the horse in the box was watered from the spruit alone.

With the result of this experiment you are probably familiar—the horses outside the box fell victims to the disease and were replaced by other fresh horses, which in their turn succumbed, leaving the horse in the box close at hand absolutely healthy.

The other method of protection was by stabling the horses it was sought to protect in a smoky atmosphere. For this purpose two rough wattle-and-daub stables were erected and horse-dung fires were set smoking about sundown in the doorway. During the day some of the animals thus stabled were permitted to graze naturally, but were brought up as

the sun got low. Four or five control horses picketed round about went down one after another with the disease, but no case of sickness occurred amongst the horses in this rough stable in which the air was kept smoky by a smouldering fire.

Thus, by a gradual process of elimination, we showed that most of the factors and influences which we have been taught to regard with suspicion are harmless, and we must admit the possibility of a disease-producing Something unconnected with food, water, wind, and atmospheric influences, dew and even spider web. It must be capable of rapid transmission, must be associated with moisture and absence of sunlight, it must be absent during heavy rains but prevalent afterwards, cold weather checks it, a fine gauze debars it, and when it travels it certainly does not prefer a Smoking Compartment. What will satisfy our equation but a flying insect, active about sundown and sunrise, fond of moisture, avoiding the light and the heavy rain and being most vigorous and aggressive in the close and sultry weather of our summer climate?

I have frequently met with the objection that mosquitoes exist sometimes in great numbers in places and at times when no Horsesickness can be heard of.

This certainly is so, and the objection has been even more frequently brought against the possibility of human malaria being transmitted by this means in other countries. The fact is that a special species of mosquitoes is necessary to the spread of malaria or yellow fever, and the same may be proved to obtain in Horsesickness.

We must remember that as many as 150 different sorts of the genus *Culex* or the ordinary mosquito so prevalent here have already been described, and of the genus *Anopheles*, some 50 varieties have already been classified, and probably as many of the the *Stegomyia*.

When we remember that in the case of malaria only four or five of these 50 varieties of *Anopheles* are possibly concerned, it will be seen that it is not every mosquito that buzzes and bites at night which can be necessarily considered a culprit in Horsesickness. In fact, on this subject, I have gone but a very little way, having had my hands full with other lines of work and duties. So I can only bid you beware of the mosquito in the abstract, and, as in French Criminal Law, consider them all guilty until their innocence has been clearly proved.

In an earlier report on the disease, you may remember there that I showed that horses confined in a box with certain mosquitoes were not affected by the bites of same until steps were taken to ensure the infection of the mosquito by previous feeding of the insect on Horsesickness blood or a sick horse.

When such infected insect bit the horse within the box, a definite and severe temperature reaction generally followed in some ten to fifteen days afterwards, and, although the horse did not die, the bite of even a few mosquitoes produced a severe and otherwise unaccountable train of symptoms.

The same effects can be produced artificially in the horse by introducing a minute quantity of the virus of the disease into the animal's stomach as a drench or directly into its veins by means of the syringe. That it is necessary to administer such dose of virus with the greatest nicety will be recognised when I tell you that less than 1/10,000th part of one cubic centimetre of an active Horsesickness blood is sufficient to produce the disease when introduced into the veins of a horse.

By way of the stomach the dose may be larger, and I have successfully treated a series of horses with increasing doses of virus by this means until they resisted without reaction a dose of blood, each dose of which would have sufficed to kill several horses with certainty.

We therefore need not be surprised to find that a fatal result does not necessarily attend the biting of an experimental horse by a few infective mosquitoes, particularly as it is difficult to get many insects to bite again when they are already distended with blood. It is further possible, of course, that of the mosquitoes so introduced, the right variety was not present, and that had other and more suitable varieties (unrecognised as yet) been infected and allowed access to these horses, fatal results might have ensued.

While this is conjecture, however, the fact remains that certain well known varieties of mosquito can produce even in small numbers, when infected, an extraordinary disturbance of the system of the horse, and such a fact (in conjunction with the fact that horses protected from flying insects are protected from Horsesickness) lends the strongest presumptive evidence to the correctness of the theory that the disease is produced by the mosquito.

As a practical outcome I can with confidence urge upon you the expediency of adopting some such measures as those described by me above. I believe the smoke system to be more available and practical than trusting to gauze doors and windows, but where valuable horses are concerned I think the extra expense of fitting the stables with mosquito-proof gauze will be well repaid, always remembering that, "as the strength of the chain is to be measured by its weakest link," so the efficiency of the gauze protection will often depend on the care with which such precautions are adopted and maintained. Under the direct supervision of the owner all would go well, but when the lazy kafir or prefunctory coolie are only available then I think the smoke system is the better and safer of the two precautions. The best results have been found to attend the use of smoke in stables where such precautions have been efficiently and thoroughly carried out, and large stables in bad locations have safely gone through severe seasons without a single loss.

I have seen no evil results follow the long confinement in a smoky stable, and, after the fires have been smouldering for some days the walls and fittings, in fact the whole interior, of the stable become impregnated to such an extent as to make it a matter of indifference if the fires should go out by accident during the night.

In conclusion, knowledge of these facts must, I think, be considered an advance on our knowledge as to how the disease is to be prevented where stabling is available. Another problem of equal importance—how to confer resistive power or immunity on unstabled horses—is now occupying my attention, and, though I am not able to bring forward at this time any details of this work, I am able to say without entertaining an unscientifically rosy optimism, I am very hopeful that the means will be attained perhaps earlier than we allow ourselves to hope.

If failure results, as well it may, we shall remember *Ars longa, vita brevis est*. Science will triumph in the end, and her brightest triumphs have often been built up upon the past failures of her votaries.

Natal Orchard Association.

THE following is a circular issued by the Natal Orchard Association:—Now the citrus fruit season is so near at hand you will doubtless be looking for lucrative markets, and it is with the object of inducing you to dispose of your crop yourself, rather than sell to coolies or middlemen, that I am bringing to your notice the above Association, which is an organisation (temporary) formed to exploit the sale of citrus fruit on other than the South African markets, viz., in England, and on the Continent, where we are assured from past experience there is an unlimited outlet, provided growers will give that care and attention to cultivation, picking, grading, etc., that is so necessary. The Association has already received splendid support, both from growers and Government; the latter are only too anxious to assist fruit growers, but rightly say that until there is some combination amongst growers it will be impossible to help materially. It is earnestly desired that *you* should help the spirit of combination by being represented in this export with a *portion* of this year's crop. To this end I am prepared to receive offers of fruit, no quantity being too small. Membership to this Association is *free* no *fees* or *subscriptions* being necessary, the fact of a grower being a sender constituting membership. Boxes will be supplied by Government at cost price, through me, and the committee are now arranging with Government for a loan to enable the Association to pay all charges, as boxes, freight, etc. These would, of course, be a first charge on all account sales, which would be rendered about 10 weeks from date of despatch. The sale of the fruit in London (for this year at least) will be through a Government agent; growers will therefore have the guarantee of getting exactly what their fruit realises, less charges. *Each consignment will be sold on its merits.* As I have already stated, the organisation is only a temporary one, but it is hoped that from the results, and experience gained, a more complete and permanent Association will be formed, not only to sell fruit but *all products* of Coast farmers on the South African, and any other markets over-sea that it may be deemed advisable to ex-

plot. In conclusion, allow me to emphasise the importance of combination amongst *European growers* to resist the menace of coolie competition that is gradually but surely undermining the fruit industry, as it is only through co-operation are we ever likely to do any real good, and enable us to call this a "white man's country." Growers who intend sending under this scheme should give the probable quantity of oranges and naartjes they would like to send (in thousands) at once, in order that I may have sufficient time to make the necessary arrangements for boxes, freight, etc. Any enquiries or questions I will be only too pleased to reply to as soon as possible.

Trusting to receive an early and favourable reply, I am, yours faithfully,

ERNEST D. GOBLE, Secretary,
Natal Orchard Association.

18, Castle Buildings, Durban.

N.B.—Freight on box of naartjes containing about 100—1 cubic foot—7½d.

Railage on box of naartjes to Johannesburg—40lbs.—1s. 0½d.

Railage on box of naartjes to Kimberley—40lbs.—1s. 1d.

The following growers have agreed to become members of the Association and to send 632,000 naartjes:—

Messrs. C. W. Morrison, H. Scott, F. L. Whyte, A. J. Harvey, G. H. North, C. A. Rickagil, J. E. Shire, H. W. James, V. Seymour, H. Skinner, C. W. Rock, A. E. Bulstrode, H. Howard, W. G. Hillary, P. W. Stott, C. Hillary, D. Stainbank, W. W. Cato.

INSTRUCTIONS AND RECOMMENDATIONS TO PACKERS OF FRUIT FOR EXPORT.

That fruit must be cut when pale yellow, and with not less than $\frac{1}{4}$ inch of stalk, to be free from scale, clean, and quite sound.

In cutting care must be taken that fruit is not bruised, and when cut to be spread on trays or under shelter (cool and dry), two days prior to packing.

Fruit to be graded into three grades, viz.:—1st grade, 3 inches diameter; 2nd grade, 2½ inches diameter; and 3rd grade, 2 inches diameter. It is advisable that nothing smaller than third grade be sent, otherwise loss may result.

The secretary will notify senders when the Government Expert Packer will be in their neighbourhood to demonstrate how the fruit should be packed.

Boxes will bear the Association mark, but must also be clearly marked with sender's name, or initials, in the space reserved for that purpose, and other marks that may be required.

Senders under this scheme will *ipso facto* be members of this Association, and be subject to the following general rule, viz.:—

"Any sender found guilty of wilful deception in description or quantity may have his fruit rejected at the Point, where it will be liable to be inspected by members appointed by the Association for that purpose, or any other provision or rule having for its object the safeguarding of the quality of Natal fruit for the over-sea markets."

Citrus Fruit Export.

IF the end towards which things are shaping is reached, Natal will in the near future be realising some of its latent wealth in an export trade in fruit. Our Colony has possibilities in fruit export, but not until recently has it been given the attention and intelligent direction that the fruit trade, more than perhaps any other, requires.

The Minister of Agriculture (Mr. Deane) and the Minister of Railways and Harbours (Mr. Hitchins), since their accession to office, have endeavoured in every way to encourage and promote an export trade in citrus fruits. The Ministers attended a special meeting of fruit-growers convened at Pinetown on Saturday, 19th January, on the occasion of the Horticultural Show, and personally discussed the matter with the growers. Subsequently, on the initiative of the Minister of Agriculture, steps were taken for the formation of a co-operative fruit association. Such an organisation has now been formed embracing the whole Coast belt, with the title of the "Natal Orchard Association." The Association is only a temporary one, but it is hoped that from the results, and experience gained this season, a more complete and permanent Association will be formed later on to sell not only fruit but all products of Coast agriculture on the South African and any other markets over-sea that it may be deemed advisable to exploit. The Association has been formed to exploit the sale of citrus fruit on other than the South African markets, viz., in England, and on the Continent, where it would appear, from past experience, there is an unlimited outlet, provided growers will give that care and attention to cultivation, picking, grading, etc., that is so necessary. The Association has already received splendid support, both from growers and from Government. The latter are only too anxious to assist fruit-growers, but rightly say that until there is combination amongst growers it will be impossible to help materially. Membership to the Association is free, no fees or subscriptions being necessary. The fact of a grower being a sender of fruit constitutes membership. The Secretary of the Association, Mr. Ernest D. Goble, is receiving offers of fruit on behalf of the Association, and already arrangements have been made for the receipt of 632,000 naartjes from growers. The wish of the founders of this Association is to work on a commercial basis, but the Government has been asked to assist by importing the cases on behalf of the Association, and by arranging a loan to enable the Association to pay all charges, as boxes, freight, etc., pending the receipt of sums of money derived from sales in England, the Association itself not being possessed of any capital. This loan is, of course, to be a first charge on all account sales, which will be rendered about ten weeks from date of despatch. For the first year at least, the sale of the fruit in London will be through a Government agent; and this arrangement

will ensure growers getting exactly what their fruit realises, less charges. Each consignment will be sold on its merits.

The necessity for combination amongst European growers to resist the menace of coolie competition that is gradually but surely undermining the fruit industry cannot be too strongly emphasised. European producers must co-operate; and it is with the object of forming a nucleus for such co-operation and providing an outlet for our fruit that the Natal Orchard Association has been formed.

The address of the Association is 18, Castle Buildings, Durban; and the advice of this Department is that intending exporters should join this Association and place themselves in communication with the Secretary, in order that the necessary arrangements for boxes, freight, etc., may be made. It may be mentioned, for the benefit of small growers, that no quantity of fruit is too small. The Government will only recognise this Association in connection with the export of fruit, and cannot deal with individuals.

The following suggestions and recommendations for the packing of fruit have been issued by the Secretary of the Association:—

“Fruit must be cut when pale yellow, and with not less than $\frac{1}{8}$ inch of stalk, to be free from scale, clean and quite sound.

“In cutting, care must be taken that fruit is not bruised, and when cut to be spread on trays or under shelter (cool and dry) two days prior to packing.

“Fruit to be graded into three grades, viz.:—1st grade, 3 inches diameter, 2nd grade, $2\frac{1}{2}$ inches diameter; and 3rd grade, 2 inches diameter. It is advisable that nothing smaller than third grade be sent, otherwise loss may result.

“The Secretary will notify senders when the Government Expert Packer will be in their neighbourhood to demonstrate how the fruit should be packed.

“Boxes will bear the Association mark, but must also be clearly marked with sender's name, or initials, in the space reserved for that purpose, and other marks that may be required.

“Senders under this scheme will *ipso facto* be members of this Association, and be subject to the following general rule, viz.:—

“Any sender found guilty of wilful deception in description or quantity may have his fruit rejected at the Point, where it will be liable to be inspected by members appointed by the Association for that purpose, or any other provision or rule having for its object the safeguarding of the quality of Natal fruit for the over-sea markets.’”

On Saturday, 16th February, Mr. E. T. Mullens, Secretary to the Minister of Agriculture, met the Committee of the Natal Orchard Association for the purpose of discussing details in connection with the forthcoming export of citrus fruits to London.

On the question of monetary assistance on the part of the Govern-

ment, it was agreed that the Association should write to the Minister of Agriculture, asking for a loan of £1,500, this amount to cover the whole cost of the experiment, and to be guaranteed jointly and severally by members of the Association.

The matter of the appointment of an expert agent to look into the marketing of the fruit in London received some attention. Mr. Mullens informed the meeting that he had been requested by Mr. Hitchins to state that Mr. Richards, the Prime Minister's secretary at the forthcoming Conference of Colonial Premiers, would, with the assistance of Mr. J. S. Morrison, attend to this matter, and that he had further been asked by Mr. Hitchins to say that exporters might rest assured that a suitable man in London would be appointed to attend to their interests.

In reply, it was pointed out by the meeting that the gentlemen referred to were not fruit experts, and that expert handling of the consignment in London was necessary to the success of the experiment. After further discussion, the meeting asked Mr. Mullens if the Government would pay the passage of Mr. F. L. White, of Durban, to accompany the first consignment to London. Mr. White would prepare a daily report on the condition of the fruit during the voyage, which would afford a valuable guide as to further cargoes, and he would remain in London three weeks and receive two or three shipments. Mr. Mullens noted the suggestion. He further agreed to cable to Mr. Sim, who is at present in London in connection with the South African Exhibition, for suggestions as to fruit marketing in England.

The Department has received enquiries from Port Shepstone and other parts of the Colony regarding the forwarding of citrus fruits to the London markets. It strongly recommends that all intending exporters should place themselves in communication with the Natal Orchard Association. If this season's shipment of naartjes proves to be the success which the promoters are hoping it to be, the Department recommends that any future consignments of citrus fruits should be forwarded in bulk to a central organisation, that each supplier be credited with a sum representing the value of the fruit in bulk, and that the grading and packing be done by the central organisation, any extra profits being divided amongst the suppliers in proportion to the quantities forwarded.

The Government has succeeded in obtaining a reduction of freight on fruit in cold storage from Durban to London. This will place this Colony on a parity with the Cape Colony.

The so-called sacred cattle of India imported into Texas by Mr. Borden, of that State, were shipped from Karachi. Most of the animals were bulls. Should the expectation of the imperviousness of their hides to ticks and also their breeding qualities be demonstrated, it is likely that other shipments of Indian live stock will follow.

Experiment Farms.

CEDARA.

To DIRECTOR EXPERIMENT STATIONS.—

In submitting my report for the past month (February), the outstanding feature for that period has been the heavy rainfall; this is, however, invariably the case, as the heaviest monthly rainfalls are usually recorded in February. 7.94 inches were registered, and as it only fell on 12 different dates it will be understood that it rained heavily at times. From the 1st July we have now had over 30 inches of rain, which is above previous records for a number of years.

The Mangels, as mentioned in my last report, having proved a failure, the ground has been planted with swedes and turnips. The seed sown was a mixture of several varieties; they germinated fairly uniformly, but, owing to the heavy rainfall, and Reit Spruit overflowing its banks and flooding the ground, the crop has received rough treatment; however, with surface cultivation, thinning, and favourable weather, they should now prove a fair crop. A further portion of four acres in front of the Assistants' Quarters has been planted, and the ground formerly used for the Maize Manure Experiments, will be planted with the same crop.

A Manure Section of Flax, comprising four plots, with an approximate area of four acres, which was planted early in the month, is at date of writing looking very healthy and promising, although it suffered from the effects of the heavy rain and wash.

Two acres of Chicory have been planted, but has not yet appeared over-ground. Kale planted at the same time is just showing up.

We have been very unfortunate with earlier Cabbages, a large percentage of which were destroyed by cut-worm, in spite of repeated treatments. Later plantings are now well established.

Indian Oats have been planted and are looking very well indeed; the experiment which is being tried is to determine the quantity of nitrogen required; also, the possibility of harvesting grain in early winter, and the effect on character.

The work of organising an experiment for the improvement of the veld has been put in hand in one of the pasture paddocks. Twelve plots of an acre each have been treated with kraal, chemical manures, and lime. On the application of these manures one-half of each plot has been harrowed with light zig-zag harrows and the other half with disc harrows to break the surface and cover the manures. Pressure of work, I am sorry to say, will prevent an experiment being carried out in ploughing and preparing land for English grasses, clovers and other legumes, instructions for which have now been on hand for some time.

Attention has been given to the de-tasseling of maize crops which had been planted with different varieties in alternative rows for the

purpose of cross-breeding for seed selection. The field report necessary to be made in this connection I have no doubt would be of public interest, and is as follows:—

MAIZE FIELD REPORT.

Date

Variety
Time of planting
Manures
Soil
Reference No.

(a) *Plant in Field*:—

1. Time of: plant silking : green ear fit for cooking : partly dented or glazed : nearly ripe : ripe
2. Height of plant: average of 10 plants feet inches.
3. Proportion of ears: number of ears on 100 stalks
4. Barren stalks: number in 100 stalks
5. Position of ear: pointing upward: horizontal: pointing downward
6. Husks: adherent: medium, non-adherent:
7. Husks: abundant: medium, scanty:
8. Length of shank: distance from culm to base of ear: average of 10 plants
9. Circumference of stem: at middle of internode between second and third from the ground:
10. Circumference of stem: at middle of internode below main ear
11. Number of leaves: average of 10 plants:
12. Average width of leaf blades: average of 5 plants:
13. Average length of leaf blades: average of 5 plants:
14. Length of tassel: average of 10 plants:
15. Grain set on tassel: number of cases in 100 plants:
16. Lodging of plant: due to wind or rain: number of plants in 100
17. Root development: abundant: medium: scanty:
18. Colour of leaves: dark green: light green: greenish yellow:
19. Rust: on leaves per cent.: on culm per cent.
20. Smut: on leaves and stem per cent.: on ear per cent.
21. Borer in culm per cent.: in ear per cent.

Notes:—

(b) *Harvest Report*:—

1. Shape of ears: cylindrical: semi-tapering: tapering
2. Shape of butt: cylindrical: swollen: tapering

3. Length of ear: average of 10
4. Diameter of ear: 1-3rd of length from butt: average of 10 . . .
5. Diameter of cob: 1-3rd of length from butt: average of 10 . . .
6. Number of rows of kernels
7. Straightness of rows: straight: twisted: irregular:
8. Spacing between rows: close: medium: open:
9. Tip: well-filled: partially-filled: naked:
10. Butt: well-filled to shank: partially-filled: naked:
11. Shape of kernels from middle of ear: square: wedge-shaped:
rounded:
12. Length of kernel: longer than broad: as long as broad: shorter
than broad:
13. Length of kernel:
14. Width of kernel:
15. Thickness of kernel:
16. Size of germ: small: medium: large:
17. Character of endosperm: distribution of horny and starchy por-
tions: corneous layer only at sides of kernel. corneous layer
at sides and outer angles: corneous layer completely sur-
rounding starchy portion:
18. Colour of kernels: pearly white: creamy white: yellowish white:
light yellow: yellow: reddish yellow:
19. Colour of cob: white: light red: dark red:
20. Germination: place 100 kernels between well-moistened flannel
and keep at a temperature of 80 degrees F.: first day
per cent.: second per cent.: third per cent.:
fourth per cent.: fifth per cent.

Ground has been ploughed for a variety of fallow crops which are to be turned under green during the spring. These are Barley, Soy Beans, Lupines, and Rye.

On the Catch Crop Section, Winter Tares, Rye, Winter Oats, Horse Beans and Rape are now planted.

The amount of labour entailed in clearing all ground for the various crops has been exceptionally heavy this season, and, although a good deal in that way has yet to be done, the growth of weeds will not be to the same extent as during the past two or three months.

With a view to further economy, a transfer of Indians has been effected with the N.G.R., their places being taken by a gang of rebels, who, so far, have proved quite satisfactory. They are put to work in gangs under police supervision.

A few coolies are still kept for work that it would be inadvisable to employ convict labour on.

The officer reported sick in my last report, I am pleased to say, has now recovered and assumed duty.

ALEXANDER REID,
Farm Manager.

THE COLLEGE.

TO DIRECTOR EXPERIMENT STATIONS.—

I am glad to be able to report a considerable increase in numbers during the last month. We now have 21 students on the books, and, as five more are entered to come by the end of this month (March), we shall very soon have reached the limit of our accommodation. I do not well see how the present building can be made to hold more than 28, and the question of increased accommodation must very shortly be faced. I would suggest that a bricklayer be engaged, who, with the Farm carpenter and students, might build more sleeping accommodation on a different plan to the present building. By this arrangement a double advantage would be gained. We should obtain the extra accommodation that we are likely shortly to require, and the students would gain most useful experience in learning how to erect good, permanent brick buildings. At present no instruction is given in building except by the carpenter in wood and iron work. If we could obtain the services of a competent bricklayer, we should then be able to give instruction in this method of building, which would, I hope, give a healthy stimulus to this more satisfactory style, and do something towards reducing the enormous amount of rough and unsightly wood and iron sheds that are to be seen on so many farms in the Colony to-day.

The work of the School has progressed steadily during the past month, both in the field and lecture room.

C. W. HANNAH,

Headmaster.

LABORATORY REPORT.

FIBRE NOTES.

TO DIRECTOR EXPERIMENT STATIONS.—

A sample of green leaf and also fibre obtained from the plant *Sansevieria guineensis* (?) and recently forwarded by Mr. Adams, of Adamshurst, was submitted to analysis for the purpose of determining its chemical value, and it may be of interest, in view of the attention now being paid to the production of fibre, to compare it in some measure with that of the *Furcraea gigantea* or aloe, so much in favour as a fibre-producer.

The *Sansevieria guineensis* or Bowstring Hemp is familiar to many, it has long, erect lanceolate leaves, 3 to 4 feet long and 2 to 3 inches broad in the middle, narrowing gradually to an acute apex; the surface of the leaf is mottled with broad irregular bands of white.

Samples of *Furcraea gigantea* green leaves grown in different districts of Natal were examined some time ago, and these are given under their respective headings alongside of the *Sansevieria* referred to.

	Sansevieria.	Furcræa gigantea.	
		Port Shepstone.	Duff's Road.
Moisture, per cent.	88.63	85.18	86.95
Fibre, per cent.	4.12	5.06	4.35
Ash, per cent.	1.63	1.79	1.60
Length of Leaves	2 to 4 ft.	4 to 5 ft.	6 to 10 ft.
Weight of Leaves, average	6 oz.	—	5 lbs. 5 ozs.

The leaves of the *Sansevieria* submitted were both shorter and narrower than those of the *Furcræa*, and the percentage yield of fibre somewhat less.

It will be observed that there are some differences in the proportionate composition of the individual samples of the *Furcræa* itself as grown in the two districts. That grown near Duff's Road, on the North Coast, is much longer than that obtained further south; the leaves of the former were longer and slightly broader; they contained rather more moisture and less fibre, but produced a larger yield of fibre per plant.

A comparison was instituted between the soils of each district in order to determine the difference in composition, if any, which might account for the variations in the leaf production; the difference in climatic conditions was also regarded as a probable source of influence on the plant's growth, the more tropical nature of the North—greater heat and humidity—being conducive to a ranker growth.

Hereunder is given a statement of the average percentage composition of five Port Shepstone soils and of a Duff's Road soil, taken from the land in which the plants were grown:—

	I.—Port Shepstone.	II.—Duff's Road.
Moisture	1.41	6.47
Loss on Ignition	3.98	8.02
Insoluble Matter	88.29	73.22
Silica	0.23	0.03
Phosphoric Acid	0.03	0.22
Potash	0.09	0.07
Lime	0.06	0.32
Magnesia	0.05	0.31
Sulphur Trioxide	0.10	—
Iron and Alumina	5.39	11.39
Chlorine	0.005	—
Nitrogen	0.06	0.18
Humus	1.98	3.63
Gravel and Fine Sand	74.25	—
Fine Material, Clay and Silt . .	25.75	—
Soluble in Dilute Citric Acid.		
Phosphoric Acid	0.003	0.008
Potash	0.008	0.019

A comparison of these two soils results very much in favour of No. 11., in which Nitrogen, Phosphoric Acid and Lime are much more in evidence, the Citric Soluble Potash being also in better proportion. The lime itself has probably a good deal to do with the better yield. The difference displayed in the growing and producing qualities of the plant under the two local conditions may bear the interpretation or indicate that, although the plants do well on poorer soils and slightly cooler and drier districts, they will respond to more favourable conditions of soil and climate.

The sample of extracted fibre submitted from the *Sansevieria* was white with a slightly yellow tinge, lustrous and of considerable strength; its chemical examination, which is of importance in determining the value for commercial purposes, is given below in juxtaposition with the average of several samples of the *Fureraea gigantia* reported on by the Imperial Institute and recorded in their technical reports:—

	<i>Sansevieria guineensis</i>	<i>Fureraea gigantia</i>
Moisture	12.5	9—11
Ash	0.5	2—3
Loss on Hydrolysis (a)	8.9	
Loss on Hydrolysis (b)	11.4	
Loss on Mercerisation	6.0	11—16
Gain on Nitration	29.6	34—40
Cellulose	77.9	72—78
Length of Ultimate Fibre	1.5—5 m.m.	1—5 m.m.
Length of Staple	3 ft.	4 ft.

The percentage of true cellulose, the length and strength of the fibre, and length of the ultimate fibre, are of first importance in valuation. The amount of moisture is to some extent an index of the susceptibility of the fibre to attack by hydrolytic agents. Fibre of the better class show relatively low moisture.

The action of dilute Alkali is given under loss on Hydrolysis: (a) When subjected to its action for five minutes; (b) when in contact for an hour, the results indicate ability to withstand prolonged exposure to moisture and Alkali liquors such as are used in washing; a low percentage of loss is indicative of a better fibre.

Under loss on mercerising the power of the fibre to withstand the action of strong Alkali is given.

The fibre of the *Sansivieria* is said to be a very valuable one, and is used for many purposes, including the manufacture of cordage and twines, ropes and textile fabrics.

ALEX. PARDY, F.C.S., etc.,

Analyst.

WEENEN.

TO DIRECTOR EXPERIMENT STATIONS.—

During the month of January the principal work in hand has been the ploughing up of all available land for winter planting. The most of this land has to be levelled and graded before seeding operations can be properly carried out, and, unfortunately, this work, and likewise most outdoor work, has been delayed by the incessant rain that is being experienced lately. However, as the proper time for planting winter cereals for this locality is from mid-March to end of April there is as yet plenty of time for carrying this work out properly, and to put seed into ground not properly prepared is, as you know, more or less waste of time and materials.

As you requested, the first thing being done is the planting of the section for drainage tests. The seed has not yet been planted, but will be done as soon as possible. I have noticed that the tile drains on this section have been running freely since the rainy weather commenced, and the results of the under drainage is apparent on the surface, which is comparatively dry and mellow.

A large drain is being dug along the natural depression on lower end of station, the lands adjoining which have become rather swampy since the advent of the rainy weather. This drain will shortly be completed.

I am constructing a grading machine, which will be required for grading operations as soon as weather permits.

The varieties of tobacco which have been planted have unfortunately been badly knocked about by hailstorms, an unusual number of these storms being experienced this season. Notwithstanding this the tobacco is making fair headway. The building of the flue curing barn is in hand and is being proceeded with as fast as circumstances permit.

On the Cultivation and Manure Test Plots of Lucerne good results are being obtained from cultivation between the rows with a 14-tooth cultivator taking two rows at a time. Though this cultivator has only been in force for a few months, the result, as compared with no cultivation plots, is very marked indeed. It is to be expected that as time goes on the advantage will be still more apparent than at present. It is yet too early to observe the result of manures on these plots, as it has only recently been applied.

Different varieties of Celery transplants will shortly be available for planting out in field, and seedlings of Asparagus and Rhubarb are being raised.

F. McPHERSON,
Curator.

 WEENEN.

TO DIRECTOR EXPERIMENT STATIONS.—

I have to report that no planting operations have been practicable since your last visit owing to incessant rain. I regret that this is so, as I promised to have the drainage test field planted early. However, as far as proper time for planting is concerned, nothing has been lost by not having yet planted, as the proper month and time for planting these crops is next month, April. I am now doing the best thing possible under the circumstances, viz., cross ploughing and preparing all available land for planting next month. This cross ploughing is quite necessary, in fact, absolutely necessary, as quite a crop of weeds have sprung up, as is always the case in January and February, and to try and plant and grade land full of half rotten weeds and grass is waste of time. Good progress is being made with tobacco barn, the walls now being three-parts finished. Mr. Walters has very kindly offered to help me to put the roof on, and this will be done as soon as possible. Unfortunately, I find that a part of the materials have been left at Estcourt or somewhere, which may delay us a day or two.

The tobacco in field is apparently very stunted, but has made fair progress, considering that it was twice cut up with hail in the young stage. I am also of the opinion that the planting was done too late in the season. This, of course, was unavoidable under the circumstances.

F. McPHERSON,

Curator.

 WINKEL SPRUIT.

TO DIRECTOR EXPERIMENT STATIONS.—

During the month of February seeds were sown as follows:—Asparagus (which has failed to germinate), Maize on the two sections formerly occupied by Russel's Big Boll Cotton, Maize on Kraal Manure Section, Peanuts, Tea, and Cowpeas. Arrowroot was also planted, but this does not appear to be doing any good, due to being planted too late in the season.

Mostly all other crops have made splendid growth during the month, owing, no doubt, to the high temperatures and heavy rainfall. The maximum shade temperature averaged for the month 82 1-7th degs., constituting a record for this Farm.

The rainfall has been exceptionally heavy, over 9½ inches being registered. Heavy downpours occurred on the following dates: 2nd,



NEW TYPES OF SUGAR CANE UNDER CULTIVATION AT
WINKEL SPRUIT EXPERIMENTAL FARM.

- | | |
|------------------------|-----------------------|
| 1. Antigua B. No. 15. | 2. Antigua B. No. 95. |
| 3. Antigua B. No. 100. | 4. Queensland No. 3. |
| 5. Queensland No. 2. | |



NEW TYPES OF SUGAR CANE UNDER CULTIVATION AT
WINKEL SPRUIT EXPERIMENTAL FARM.

- 6. Honolulu Rose Bamboo.
- 8. Demerara D. No. 95.
- 10. Demerara D. No. 145.

- 7. Honolulu Laibainer.
- 9. Demerara D. No. 100.
- 11. Demerara D. No. 626.

3rd, 4th, and 16th, and registered 2.15 inches, 1.63 inch, 1.95 inch, and 1.33 inch respectively. A great deal of damage was done by the storms on the 2nd and 3rd insts., causing numberless wash-outs all over the Farm; the sections to suffer most were the Chicory, Maize (Kraal Manure Section), Potatoes, and Tea.

Although we were sadly in need of rain at the time, we were unfortunate in having such heavy storms, as, out of 2,200 young tea plants just planted, about 75 per cent. of them were destroyed. The Kraal Manure Section of Maize was completely washed out, and, as stated above, was replanted. With the exception of replanting Chicory, most of the other damages have been repaired.

What was almost an impassable bog—where the road crosses the gully near the Orchardist's residence—has been transformed into a passable road, we having erected a culvert and built a corduroy roadway. We were greatly assisted in this by the Orchardist, who had a deep drain dug down the centre of the gully to carry off the silt washed down by storms.

The clearing of undergrowth from bush land for a coffee plantation has been finished and 352 coffee stumps planted.

Weeds are growing profusely all over the Farm, and it is a difficult matter to cope with them. A horse has been purchased for the light cultivators, and with this in constant use it should materially help in keeping the weeds under in the future.

As reported to you, three of the young pigs died during the month from sickness. Blood slides have been taken from several since and forwarded to D.V.S. Amos for examination, who reported no disease.

Results tabulated from three years' experiments in cultivation and manuring of Pineapples prove that they deteriorate to a great extent each year. A section containing 22 plots was planted in January, 1904. Twelve of these plots were manured with different fertilisers, and ten (including half borders) were not manured. The first crop harvested resulted in an average yield of 2lbs. 2½ozs. per Pineapple, the second crop 1lb. 13½ozs., and the third crop an average yield of 1lb. 8ozs. per Pineapple. This deterioration was not restricted to any special plots, such as manure or no manure, but was a general one of the whole crop.

The no manure plots have given a slightly better average weight of Pine than the manure plots, conclusively proving that indiscriminate manuring would act more as a deterrent than an augmenter to this particular kind of fruit.

The following table, giving the actual results recorded—with manures used—may prove of some value to Pineapple-growers. The quantities of manure given are per acre, and the same kinds of manure used on each plot each succeeding year.

PINEAPPLE RESULTS, 1905, 1906, 1907.

Plot.	1904. Manures.	1905. Average Weight per Pine.	1905. Manures.	1906. Average Weight per Pine.	1906. Manures.	1907. Average Weight of Pines.
B $\frac{1}{2}$	lbs. ... No Manure ...	lbs. 2 2-5/8	No Manure ...	lbs. 1 12-2/3	No Manure ...	lbs. 1 7-3/8
176	{ Sulphate of Ammonia ... Superphosphate ... Chloride of Potash ...	{ 50 30 25 }	{ Do. 1904 ... Do. do. ... Do. do. ...	{ 150 150 100 }	{ No Manure ... Do 1905 ... No Manure ...	{ 1 7-3/8 1 9-4/17 1 10-6/19
177	{ No Manure ... Sulphate of Ammonia ... Superphosphate ... Chloride of Potash ...	{ 100 100 50 75 }	{ No Manure ... Do. 1904 ... Do. do. ... Do. do. ...	{ 300 300 150 450 }	{ No Manure ... Do. 1905 ... Do. 1905 ... Do. 1905 ...	{ 1 10-6/19 1 14-1/2 1 12-10/17 1 10
178	{ Sulphate of Ammonia ... Superphosphate ... Chloride of Potash ... Sulphate of Ammonia ... Superphosphate ... Chloride of Potash ...	{ 150 150 150 75 }	{ Do. 1904 ... Do. do. ... Do. do. ... Do. do. ... Do. do. ... Do. do. ...	{ 300 150 450 200 }	{ Do. 1905 ... No Manure ... Do. 1905 ... Do. 1905 ... Do. 1905 ... Do. 1905 ...	{ 1 12-10/17 1 10 1 6-10/19 1 14-1/6 1 5-5/8 1 8-2/11
180	{ No Manure ... Sulphate of Ammonia ... Superphosphate ... Chloride of Potash ...	{ 100 100 50 100 }	{ No Manure ... Do. 1904 ... Do. do. ... Do. do. ...	{ 300 150 150 150 }	{ No Manure ... Do. 1905 ... Do. 1905 ... Do. 1905 ...	{ 1 14-1/6 1 5-5/8 1 8-2/11 1 12-1/4 1 6-9/11 1 8-2/15
181	{ Sulphate of Ammonia ... Superphosphate ... Chloride of Potash ... Sulphate of Ammonia ... Superphosphate ... Chloride of Potash ...	{ 100 100 50 100 }	{ Do. 1904 ... Do. do. ... Do. do. ... Do. do. ... Do. do. ... Do. do. ...	{ 300 150 150 150 }	{ No Manure ... Do. 1905 ... Do. 1905 ... Do. 1905 ...	{ 1 14-1/6 1 5-5/8 1 8-2/11 1 12-1/4 1 6-9/11 1 8-2/15
182	{ Sulphate of Ammonia ... Superphosphate ... Chloride of Potash ... Sulphate of Ammonia ... Superphosphate ... Chloride of Potash ...	{ 100 100 50 100 }	{ Do. 1904 ... Do. do. ... Do. do. ... Do. do. ... Do. do. ... Do. do. ...	{ 300 150 150 150 }	{ No Manure ... Do. 1905 ... Do. 1905 ... Do. 1905 ...	{ 1 14-1/6 1 5-5/8 1 8-2/11 1 12-1/4 1 6-9/11 1 8-2/15
183	{ No Manure ... Sulphate of Ammonia ... Superphosphate ... Chloride of Potash ...	{ 100 100 50 100 }	{ No Manure ... Do. 1904 ... Do. do. ... Do. do. ...	{ 300 150 150 150 }	{ No Manure ... Do. 1905 ... Do. 1905 ... Do. 1905 ...	{ 1 14-1/6 1 5-5/8 1 8-2/11 1 12-1/4 1 6-9/11 1 8-2/15
184	{ Sulphate of Ammonia ... Superphosphate ... Chloride of Potash ... Sulphate of Ammonia ... Superphosphate ... Chloride of Potash ...	{ 100 100 50 100 }	{ Do. 1904 ... Do. do. ... Do. do. ... Do. do. ... Do. do. ... Do. do. ...	{ 300 150 150 150 }	{ No Manure ... Do. 1905 ... Do. 1905 ... Do. 1905 ...	{ 1 14-1/6 1 5-5/8 1 8-2/11 1 12-1/4 1 6-9/11 1 8-2/15
B $\frac{1}{2}$	{ No Manure ... Sulphate of Ammonia ... Superphosphate ... Chloride of Potash ...	{ 100 100 50 100 }	{ No Manure ... Do. 1904 ... Do. do. ... Do. do. ...	{ 300 150 150 150 }	{ No Manure ... Do. 1905 ... Do. 1905 ... Do. 1905 ...	{ 1 14-1/6 1 5-5/8 1 8-2/11 1 12-1/4 1 6-9/11 1 8-2/15
185	{ No Manure ... Sulphate of Ammonia ... Superphosphate ... Chloride of Potash ...	{ 100 100 50 100 }	{ No Manure ... Do. 1904 ... Do. do. ... Do. do. ...	{ 300 150 150 150 }	{ No Manure ... Do. 1905 ... Do. 1905 ... Do. 1905 ...	{ 1 14-1/6 1 5-5/8 1 8-2/11 1 12-1/4 1 6-9/11 1 8-2/15
186	{ No Manure ... Sulphate of Ammonia ... Superphosphate ... Chloride of Potash ...	{ 100 100 50 100 }	{ No Manure ... Do. 1904 ... Do. do. ... Do. do. ...	{ 300 150 150 150 }	{ No Manure ... Do. 1905 ... Do. 1905 ... Do. 1905 ...	{ 1 14-1/6 1 5-5/8 1 8-2/11 1 12-1/4 1 6-9/11 1 8-2/15
187	{ No Manure ... Sulphate of Ammonia ... Superphosphate ... Chloride of Potash ...	{ 100 100 50 100 }	{ No Manure ... Do. 1904 ... Do. do. ... Do. do. ...	{ 300 150 150 150 }	{ No Manure ... Do. 1905 ... Do. 1905 ... Do. 1905 ...	{ 1 14-1/6 1 5-5/8 1 8-2/11 1 12-1/4 1 6-9/11 1 8-2/15
188	{ No Manure ... Sulphate of Ammonia ... Superphosphate ... Chloride of Potash ...	{ 100 100 50 100 }	{ No Manure ... Do. 1904 ... Do. do. ... Do. do. ...	{ 300 150 150 150 }	{ No Manure ... Do. 1905 ... Do. 1905 ... Do. 1905 ...	{ 1 14-1/6 1 5-5/8 1 8-2/11 1 12-1/4 1 6-9/11 1 8-2/15
189	{ No Manure ... Sulphate of Ammonia ... Superphosphate ... Chloride of Potash ...	{ 100 100 50 100 }	{ No Manure ... Do. 1904 ... Do. do. ... Do. do. ...	{ 300 150 150 150 }	{ No Manure ... Do. 1905 ... Do. 1905 ... Do. 1905 ...	{ 1 14-1/6 1 5-5/8 1 8-2/11 1 12-1/4 1 6-9/11 1 8-2/15
190	{ Nitrate of Soda ... Superphosphate ... Chloride of Potash ... Sulphate of Ammonia ... Superphosphate ... Chloride of Potash ...	{ 144 100 50 100 }	{ Do. 1904 ... Do. do. ... Do. do. ... Do. do. ... Do. do. ... Do. do. ...	{ 400 300 150 300 }	{ Do. 1905 ... Do. 1905 ... Do. 1905 ... Do. 1905 ... Do. 1905 ... Do. 1905 ...	{ 1 8-25/28 1 10-1/18 1 10-1/3 1 9-1/4 1 10 1 10
191	{ Superphosphate ... Chloride of Potash ... Lime ...	{ 100 50 10 cwt. }	{ Do. 1904 ... Do. do. ... Do. do. ...	{ 300 150 1,000 }	{ Do. 1905 ... Do. 1905 ... Do. 1905 ...	{ 1 10-1/18 1 10-1/3 1 9-1/4 1 10 1 10 1 10
192	{ No Manure ... Sulphate of Ammonia ... Superphosphate ... Chloride of Potash ...	{ 100 100 50 100 }	{ No Manure ... Do. 1904 ... Do. do. ... Do. do. ...	{ 300 150 1,000 1,000 }	{ No Manure ... Do. 1905 ... Do. 1905 ... Do. 1905 ...	{ 1 10-1/3 1 9-1/4 1 10 1 10
193	{ No Manure ... Sulphate of Ammonia ... Superphosphate ... Chloride of Potash ...	{ 100 100 50 100 }	{ No Manure ... Do. 1904 ... Do. do. ... Do. do. ...	{ 300 150 1,000 1,000 }	{ No Manure ... Do. 1905 ... Do. 1905 ... Do. 1905 ...	{ 1 10-1/3 1 9-1/4 1 10 1 10
B $\frac{1}{2}$	{ No Manure ... Sulphate of Ammonia ... Superphosphate ... Chloride of Potash ...	{ 100 100 50 100 }	{ No Manure ... Do. 1904 ... Do. do. ... Do. do. ...	{ 300 150 1,000 1,000 }	{ No Manure ... Do. 1905 ... Do. 1905 ... Do. 1905 ...	{ 1 10-1/3 1 9-1/4 1 10 1 10

From this table it will be found that the average weight per Pine-apple for each year from No Manure and Manure Plots work out thus:—

1905.		1906.		1907.	
No Manure.	Manures.	No Manure.	Manures.	No Manure.	Manures.
lbs. ozs.	lbs. ozs.	lbs. ozs.	lbs. ozs.	lbs. ozs.	lbs. ozs.
2 2-2/3	2 2-1/3	1 14-1/7	1 13	1 9	1 7-1/7

Although these figures prove a better result all round from No Manures than from Manures, it does not follow that manures cannot be profitably used. Take Plot 182 for instance, which was manured with a medium dressing of Sulphate of Ammonia and Chloride of Potash, and it will be found that a pine has been produced giving an average weight for the three years of about 2lbs. 4ozs. This, again, has been closely followed by Plot 178, manured with a medium dressing of complete manures.

The most uniform Pine produced was from Plot 193, and, although these were on the small side, and proves that the use of lime has a deleterious effect for the first year or two, it is questionable—if the experiments are carried on for another three years—whether the beneficial effects of the lime will not be more noticeable.

As advised by you, half of each of these sections will be taken up and planted with young suckers. This work will be taken in hand at an early date.

W. JOHANSEN, Manager.

The Campbell System of Culture.

In order to obtain more definite information on the subject of the Campbell system, the Agricultural Department of South Australia wrote to the Directors of the different Agricultural Experiment Stations in the so-called semi-arid regions of America. The following interesting report has been supplied by the Farm Superintendent of the Kansas Experiment Station. Kansas has a population of over one and a half millions, and, in addition to other staples, produces from 50 to 90 million bushels of wheat and up to 200,000,000 bushels of maize, climatic conditions permitting a wide diversity of cropping. The Agricultural Department of South Australia are purchasing a sub-packer for the purpose of experiments in their "semi-arid" districts. The following is the report referred to:—

The Campbell system of culture is theoretically correct, and, in part or in whole, it can be put into practice on almost every farm in Western Kansas profitably. The system is intended to favour the conservation of soil-moisture, and is thus especially adapted to regions where a limited supply of irregular rainfall makes the most careful methods of soil-culture necessary, in order to conserve the water in the soil and get the most use from it in the production of crops.

So far as cultivation is concerned, there are three principles in the conservation of soil-moisture. First, the soil must be loosened to a considerable depth, in order to prepare a reservoir to receive the rain and carry the water downward into the soil. This is accomplished in the Campbell system by the deep-ploughing or by discing of the unploughed uplands. Second, the water, which is carried downward into the subsoil, must be brought again into the surface soil, where the seed is germinating and the young roots are growing; and to accomplish this a good connection must be made between the furrow slice and the subsoil below, and this is the purpose in the use of the subsurface-packer. Third, finally, in order that the water, which is drawn up toward the surface, may not reach the air and be wasted by evaporation, the upper two to four inches of the soil must be kept mellow, in the form of a soil mulch, which is accomplished by frequent cultivation, and is applicable not only to corn and other ordinary crops, but also to wheat and other small-grain crops.

Discing the land before ploughing puts the soil of the furrow slice in better condition to re-unite with the subsoil. The smooth, hard furrow bottom, left by the ordinary plough, however, is unfavourable to the proper union of the furrow slice with the subsoil. To make the system more perfect, I would add one more operation, namely, the bottom of the furrow slice should be scraped or loosened, so that the union of the soil with the subsoil may more quickly take place again after ploughing. The principles stated above have been known and practised more or less for a long time; but it remained for Mr. H. W. Campbell, of Lincoln, Neb., to arrange these principles into a system of culture, and put the system into practice throughout the Western States. Mr. Campbell has done more to call the attention of the farmers of the West to the necessity and advantage of good cultivation of the soil than any other investigator. The Campbell system of culture is, in fact, simply good tillage, and good cultivation of the soil at the right time, in the right way, and in a systematic manner. Good farming pays in the West as well as in the East. I fully believe in the practicability of thorough tillage and good cultivation on every farm; and the increase in crops will more than pay for the extra work, and in a series of years will leave our farms in a better state of fertility and more capable of producing crops than will result from the careless and shiftless methods of farming which are yet too commonly carried on by many farmers throughout the West.

It is not necessary to have extra machinery in order to successfully practise the Campbell system of culture. The only implement needed which farmers do not generally have in use on their farms is the subsurface-packer. The use of the packer is most essential *on late spring ploughing, when the purpose is to plant at once after ploughing*. It is not so necessary to use the subsurface-packer on fall ploughing which is not intended to be planted until the following spring; but for sowing fall wheat, *if the ploughing precedes the sowing by a very short interval, the subsurface-packer may be used advantageously*. Where the land is allowed to lie for a considerable period after ploughing before the crop is planted, the settling of the soil, together with the cementing due to the rain, usually causes the soil to repack and firm-up to a sufficient extent to make a good seed-bed.

The subsurface-packer is a hard-running machine, and it costs more

to use it than it does to use the common harrow or even the disc harrow. Thus at the Kaasas Experiment Station we have adopted the practice of early ploughing whenever it can be done, in preference to subsurface-packing, using the harrow immediately after ploughing. However, the principle involved in the use of the subsurface-packer is correct, and the lighter the soil and the greater its tendency to remain loose and mellow, the more necessary it is to make use of the subsurface-packer or some similar implement, in order to prepare the seed-bed in a proper manner. Also, in ploughing under trash or manure, subsurface-packing, by pulverizing the bottom of the furrow slice, sifts the soil through the coarse trash and causes a better union with the soil below, so that the capillary water may be drawn up into the surface soil; whereas if a heavy coat of stubble or manure ploughed under in this way is left without packing or pulverizing, the furrow slice is apt to dry out, and the crop that is growing on the land may be injured by a short interval of hot weather.

By setting the discs rather straight and weighing the harrow, a disc-harrow may be used as a substitute for a subsurface-packer. In mellow, trashy ground its work is somewhat similar, resulting in pulverising and firming the soil at the bottom of the furrow slice. Very often, however, good ploughing with the proper and sufficient use of the common harrow, may largely accomplish the results required in carrying out the Campbell system of culture.

Some types of soil can be ploughed deeper than others. As a rule, I believe in deep-ploughing—at least every few years. The deeper loosening of the soil not only makes a larger reservoir to catch the rain, but it gives more room in which the soil bacteria may develop and prepare the plant food. It is known now that certain bacteria in the soil have much to do with the preparation of the food of plants, and experiments have shown that these bacteria are found largely in the surface, six to nine inches of the soil, or in that part of the soil which is turned by the plough and stirred with the cultivator. Thus deep-ploughing favours the development of these bacteria and the preparation of more available plant food than is the result from shallow ploughing. It may not be best to plough deep every year; sometimes shallow ploughing will doubtless give better results, and occasionally it is best not to plough at all. The depth and frequency of ploughing will vary according to the nature of the soil, a light or sandy soil requiring less depth of ploughing and less frequent ploughing than a heavy, compact, clayey, or gumbo soil. This fact should be borne in mind, that when the land is ploughed deep it is necessary to re-establish the capillary connection of the soil with the subsoil and prepare a good seed-bed condition by the methods described above, in order that unfavourable results may not come from the deep-ploughing.

The principle of loosening the surface of the soil and keeping a mulch of mellow soil in order to break the capillary movement of water and prevent its evaporation, is well recognised by farmers generally, and is also practised to a greater or less extent in the cultivation of all kinds of crops. In the Campbell system of culture the purpose is to keep a mellow soil mulch on the surface of the land all the time, not only during the growing season of the crops, but also in the interval between harvest and seeding time. Thus, after the crop is planted the land is kept cultivated with the harrow or weeder, in order to break the sur-

face crust and conserve the soil moisture; and, following out the same principle, the harrowing or work with the weeder is continued after the grain or corn is up, and during the growing period frequent cultivation is practised. After the crop is harvested the cultivation is not discontinued, but the surface of the ground is loosened as soon as possible after the crop is removed, by the use of the disc-harrow, and thus the soil is kept continually in a condition, not only to prevent the loss of water already stored in the surface soil, but this same condition and the mellow surface favour the absorption of rain and largely prevent the loss of water by surface drainage.

The weed-harrow, or weeder, is probably a better implement for harrowing wheat or other small grain than the common straight-tooth or even the slanting-tooth harrow. The weeder is somewhat objectionable on account of the wheels. When the ground is reasonably firm the common harrow may be used without injuring the wheat.

I question whether it is necessary to continue the harrowing after the wheat covers the ground well, unless very heavy rains firm and puddle the soil, destroying the mulch of mellow earth. Usually, this will not occur. I have harrowed wheat when it stood five or six inches high, and had stood so as to about cover the ground, and the mulch thus produced was still in evidence at harvest-time. In this experiment the ground was harrowed twice on the same day. The yield of wheat from the harrowed field was, on the average, three bushels per acre above that from the field adjacent not harrowed. This experiment, with others, was carried on at the North Dakota Experiment Station with spring wheat, and it was observed that wheat harrowed before it had stood much was injured in stand, and gave a lower yield of grain than wheat not harrowed. Wheat or other small grain may usually be harrowed without injury before it comes up, but after the grain is up it should not be harrowed until it has established a good root and made considerable top growth. It appears that even with winter wheat there may be some danger of injuring the wheat if harrowed too early in the spring, and I would not, as a rule, advise to harrow in the fall. Experiments in the harrowing of wheat and in the practice of the Campbell system of culture are being undertaken at the Fort Hays Branch Experiment Station, in Ellis County, Kansas, and also at the Experiment Station at Manhattan, Kansas.

A. M. TEN EYCK,

Professor of Agronomy and Superintendent of Farm,
Kansas Experiment Station, Manhattan, Kan.

It is well known in the West Indies that the seed from a good American variety of tomato, locally grown, does not produce such large fruits as seed direct from England or the United States. The tomato, however, is very easily grown from cuttings, and advantage can be taken of this fact to prevent deterioration of the fruit. This method has been practised for several years at St. Lucia. A planter in Christ Church, Barbados, has also grown tomatoes from cuttings, without using any seed, for ten years. The cuttings when rooted are planted out in the cane field. The field being a dry one the plants are not staked, but are allowed to bend to the ground under the weight of the fruit. In favourable seasons excellent crops of this whole some vegetable have been produced by this method.

Some Facts About Tea.

A RECENT issue of the *Scientific American* contains the following interesting article by L. Lodian on the subject of tea.

Notwithstanding the almost universal use of tea, folk in general know very little about it—certainly little beyond that they drink a decoction of it, usually of the cheaper grade, known as “mixed tea”—rarely a properly made infusion; and thrifty housewives use the refuse tea-leaves to “lay the dust” in sweeping. With the innumerable uses to which tea is put in other countries they are unacquainted.

In China, tea-leaves are also used in sweeping floors, but this does not end their utilitarian purposes. In regions where fuel is scarce the refuse leaves are pressed into bricks, dried, and used in the same manner as blocks and peat. This fuel is particularly prized for pork-curing, and the tea-cured or tea-smoked meat is to the Chinese what beech-nut and sugar-cured bacon and ham are to us. The ashes from the fuel are used as a fertiliser. But even before its use as fuel, the refuse tea serves another purpose. The leaves are vigorously stewed or allowed to steep in cold water in order to recover the tannic acid which they contain (about 12 per cent.) This is used in tanning leather and in dyeing textiles. It gives a fine, permanent nut-brown colour, requires no mordant, and is unaffected by sunlight, bleaching, or washing. Sometimes the refuse tea-leaves are used as fodder for farm stock—at least providing bulk if not much nutrition. Again, they may be dried, mixed with the low-grade, factitiously-scented teas of commerce, and are then known as “lie-tea.” The decoction resulting from such tea cannot be far superior to one made from the common hay with which we are all acquainted.

The queerest use to which brick-tea has ever been put in the Orient is in the capacity of money. We find mention of this peculiar form of currency in “Knight’s Mechanical Dictionary,” in the “Encyc. Americana,” and in “Abbe Huc’s Travels in Tartary, Tibet,” etc. It is still in circulation as a medium of exchange in the far-inland Chinese towns and in Central Asian marts and baazars, southward to the Pamirs and Tibet, and northward across Mongolia to the Siberian Frontier. Between the Mongolian town of Urga and the Siberian town of Kiakta, there is still as much as half a million taels of this money in circulation. At the latter place it ceases to be used as currency, and enters into the regular brick-tea trade of Siberia and Russia. As brick-tea, it is largely used in the Russian Army by surveying engineers, touring theatrical companies, travelling hunters, and sportsmen and tourists in general.

The value of the specimen illustrated in the engraving (not reproduced) is about 2 taels, say, 9s. 5d.; it is a high-grade bohea or black tea. The farther it gets from the eastern tea-growing regions, the more its value increases. By compressing more expensive teas, similar-sized bricks are produced, representing values of £2, £4, £6, and upward. According to Abbe Huc, payments in Tartary are generally made for all commodities in brick-tea currency. Many of the highest-grade Chinese teas never leave the country—that is, are never exported in commercial quantities. Tea specialists in Europe and America manage to obtain specimens through corresponding firms in Chinese export centres, but

these samples are not for sale. These rare teas are preserved for occasional comparison and testing with the general commercial teas; they are known as "unexported teas." I have known of only one person (outside the tea-producing countries) who supplies the trade or the general public with specimens of the rare teas. His prices range from £15 12s. 6d. to £20 16s. 8d. per pound. As not even an expert can safely judge such tea by its appearance alone, it is necessary to taste it in the cup before purchasing. The vendor can hardly afford to dispense this £20-tea gratuitously, so a charge of 4s. 2d. to 6s. 3d. per cup is made; and as a judiciously-prepared infusion allows the making of about 200 cups per pound of tea, the profit from this tasting is almost gigantic. On rare occasions, exceptionally valuable teas, sold at auction in London, have brought from £47 to £57 per pound. But these fancy prices—almost literally worth their weight in gold—are rarely seen by ordinary people; they are preserved in sealed glass jars in the safes of the tea specialists who own them. Such exceptional teas are worth the high valuation placed upon them, and the purchases are not merely the results of some fad, for London's tea-centre experts include some of the shrewdest tea-connoisseurs living. Tea, not from the leaves, but from the flowers alone of the plant, is rarely encountered in commerce. The petals, stamens, etc., are semi-dried, and the resulting tea is of a rich, deep-brown hue of peculiarly delicate odour, and gives a pale amber-coloured infusion rather more astringent than that from the average fair-grade leaf. The taste for it is an acquired one, and even if this tea could be made commercially possible, it is doubtful if it would ever become popular. The American tea trade could advantageously take a suggestion from the brick-tea of the Far East. In our country, the tea-dust, some of which is of good quality, is not properly utilised. In Europe it is a regular article of trade, and is advertised and sold as tea-dust. In America it is sold to thousands of cheap restaurants, who make it the mixture of tannic acid, sugar, and boiled milk which they sell as "tea." If, as in the Orient, this dust were compressed into bricks, good tea could be made from it, and the product would find a ready market through the multitude of uses for which it is adapted. A beginning in this direction has been made by the Pinchurst Tea Estate in South Carolina, and in Europe similar advances have been inaugurated.

The virgin tea (*biepjski-chi*), so called from its use at Chinese weddings, is the semi-dried leaf intact, tied up with three strands of coloured silk. After infusion, these fagot-like bundles are pickled in vinegar and used as salad. This tea is sold in especially handsome silk-covered and glass-covered boxes. The rarest of all teas, and one that has never been known to reach this country, is a naturally sweet tea, produced in Western China on a very limited scale. Its culture is centuries old, and the secret has been jealously guarded from generation to generation. The saccharinity is probably due to grafting and years of patient study and care, such as only the small Chinese tea-farmer is capable of bestowing. The "body solidity" of Chinese teas is said to be far superior to that of the Indasian product. Experts claim that if Chinese teas and those of India or Ceylon be comparatively tested, it soon becomes apparent that the cup qualities of the latter are far more ephemeral, while those of the former are far more staying. This is believed to be the result of the tea-culture in India and Ceylon on large plantations by means of hired coolie labour, where there is no incentive;

to personal effort in the betterment of the product. In China, on the other hand, tea-raising has, since time immemorial, been conducted by small farmers, each owning a few acres of land, and bestowing upon his crop his entire time, labour, and intelligence, knowing, as it were, the condition and peculiarity of every bush; and this intensive culture has resulted in bringing the body-solidity of the tea to a remarkably high state of perfection. This is one of the reasons why we hear of Chinese teas—never Indasian ones—sometimes bringing more than £20 per pound. In late years the plantation and coolie system has been introduced into China by foreign concerns controlling the entire output of large tracts of country. The result has been the partial deterioration of Chinese tea, but China will probably always be able to hold her own with regard to the production of the higher-grade leaves.

In buying tea, a good rule for the uninitiated to follow is never to pay less than 4s. per pound. Numbers of firms sell teas at 8s., 16s., and 25s., and these are usually worth the price, though it is possible to purchase really good tea for 4s. Fair grades of leaf may be obtained for 3s. and 2s., but those selling under the latter value are not worth considering. It is very rare, by the way, to find good teas in small grocery stores, as these have not sufficient call for them to warrant carrying a stock. The leading kinds of black teas are *Peko*, *Kongu*, and *Suchong* (*Cianchang*). "Peko" is the Chinese word for "down," in reference to leaves so tender that they are still covered with a soft down—Nature's protection for the budding leaf against sudden and undue chill. Among green teas we have the imperials, hisons, formosas, alongs, etc. The latter are sometimes classed among black teas, though along is really a green tea of blackish leaf. The Chinese themselves class it among green teas.

Oil from Mealies.

THE following is an extract from the *Orange Judd Farmer* on the subject of corn or maize oil:—

"Within comparatively few years a considerable industry has been developed in extracting oil from corn and placing it on the market. In answer to a question from a subscriber, who wishes to know to what extent oil is extracted from corn and sold for commercial purposes, it may be stated that 3,000,000 gallons to 5,000,000 gallons represent the annual product. Corn oil is used to some extent for culinary purposes, is manufactured into substitute for India rubber, is used as a lubricating oil and in the mixing of paints. The last Federal census report contains the statement that 75 per cent. or 80 per cent. of the amount of oil manufactured in this country is exported.

"Writing us specifically on this subject, C. P. Hartley, in charge of corn investigations, Department of Agriculture, at Washington, says for the year 1906 the exports of corn oil reached a value of \$1,172,206. The exports in the fiscal year 1906 were 3,108,917 gallons, valued at a little less than \$900,000. In 1904, the business was about the same proportions. In 1903 there was exported from the United States a total of 3,778,000 gallons of corn oil, valued at \$1,467,493."

Maize Cultivation in South Africa.

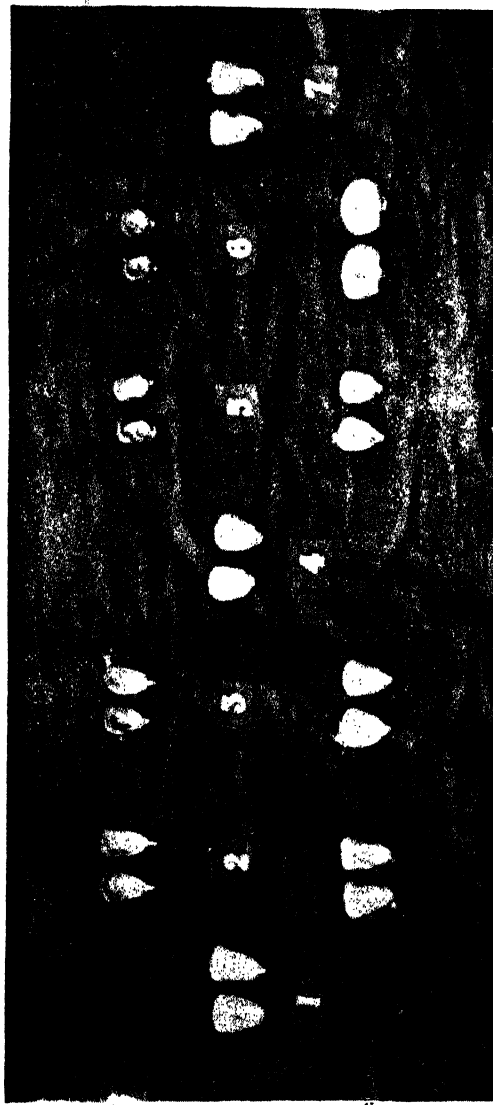
WITH SPECIAL REFERENCE TO NATAL.

By E. R. SAWER, Director Experimental Stations.

HARVESTING.

AN index to agricultural development in South Africa is furnished by widespread improvements in the methods of harvesting maize. The primitive system of allowing the ear to fully mature in the field and feeding the dried stalks to stock on the land, which was induced by the limited distribution of snow and severe frosts, is rapidly losing favour in view of the proved economies of other methods. Stock-owners are handicapped by a dry winter, during which green pasture is scarce, but the advantage of conditions favouring the growth of the maize crop in summer more than offsets this, and is sufficient in itself to place South Africa in the forefront of dairying and beef-production. No other crop can compare with maize in the cheapness and ease with which it may be grown, nor in the quality of valuable food-material produced to the acre. Harvested in the form of hay, stover or silage, it furnishes roughage which may replace the roots and fine grass-hay fed by the English breeder, while the grain, apart from its direct market value, is the most palatable and readily digested of concentrated stock foods. The kernels carry considerable oil and are full of starch, both fat-formers, and, if fed in conjunction with bean or pea meal, which furnishes the protein necessary to muscle formation, will provide all the nutriment necessary for filling the tissues of the steer's body with fat and for rendering the muscles tender and juicy. The development of a successful industry in steer-feeding in Natal depends upon cheap maize and cheap bran, from which may be secured a complete and well-balanced ration, all the constituents of which are to be raised on the farm. Failing the institution of some such general system of stock-feeding, the problem of maintaining the fertility of maize lands will become increasingly serious. When the crop is grown entirely for grain and the latter marketed, little or nothing is returned to the ground, which is repeatedly cropped year after year. The constant employment of high-priced fertilisers is therefore the alternative to a system of stock-feeding. Where the latter is adopted nitrogen is secured by the growth of bean, while potash and phosphate may be largely returned in the valuable manure derived from maize rations.

The method of harvesting the maize crop will therefore be determined by the nature of the farmer's operations. When a dairy herd or butcher's stock are to be fed, the stalk and leaves of the plant may to a certain point prove more valuable than the grain which might be de-



SELECTION OF SEED MAIZE.

- No. 1.—Shape of kernel associated with greatest proportion of grain of best quality—bluntly wedge-shaped.
- No. 2.—These kernels taper too much towards germ end, there being loss of space against cob. They are however well-shaped at outer edge, leaving little space between rows.
- No. 3.—Too rounded at either end, leaving wide spaces between rows on exterior of ear and also against cob.
- No. 4.—The germs are small and ill-defined. Such kernels are unsuitable for seed, as germination will be feeble and faulty.
- No. 5.—As broad as long. There is a loss in weight of grain owing to lack of depth.
- No. 6.—Broader than long. Unless the cob be very large the weight of grain furnished by such kernels is very much less than where the kernels are deep and wedge-shaped.
- No. 7.—Kernels damaged by weevil. These are unsuitable for seed, as germination is generally impaired.

rived from the crop, in which case the latter will be sacrificed for hay or silage. Or a dual purpose may be served, the grain being shelled and the stalks conserved in the form of shredded stover. In each case the farmer's object should be to secure his crop in the best possible condition for his purpose with a minimum outlay for harvesting operations.

MAIZE HARVESTING MACHINERY.

The employment of labour-saving machinery in harvesting operations is an essential feature where the crop is cut for stover or silage, and, though no one would wish to recommend the purchase of a plant which could not be used to something approaching its full capacity, an increase in the scale of operations spells a large decrease in the cost of production. A first improvement upon the maize-knife is the Drag-Cutter, consisting of a sled or low-wheeled carriage to either side of which is affixed a scythe-shaped knife. Some of these cutters are so devised as to allow men riding upon the machine to gather the cut stalks and bind them in movement. They are simple in construction and can be put together by any blacksmith. A further development in the same direction is the Maize Harvester, which cuts and binds bundles of stalks, and by means of a bundle-carrier attachment collects the bundles until sufficiently numerous to form a shock, when they are thrown out at the side of the machine. A second pattern builds the shock upon a platform, after which it is automatically raised by a derrick and placed upon the ground out of the way of the machine on its next round.

The Husker and Shredder, which is coming into general use, obviates the labour and cost of husking, and shreds the stalks into palatable stover. The maize is tabled from the wagon and is automatically spread out on a web: this carries it to the snapping rolls, where the ears are snapped off and drop through spaces to the husking rolls, one set of which are provided with pegs and the other with grooves. The ears are here rotated until clean of husks, when they pass on to a carrier, which elevates them into a wagon. If the grain be quite dry some quantity will be shelled, but the more recent machines are equipped with riddles and a grain elevator, which sacks the grain in a nice, clean condition. In the meantime the stalks, after leaving the snapping rolls, come into contact with the cutting head, and emerge as fine shreds which go over a shaker into the blower, and through the blower pipe into the barn or stack.

A power Silage-Cutter of one of the many satisfactory types now on the market is essential where a silo is to be filled. Maize may be used uncut, but is more difficult to pack and subsequently remove, and it is not possible to stow the same quantity in a given space. In South Africa elevators of two types are in use, namely, the direct lift and the blower. The latter, though requiring rather more power to operate, gives better distribution of the material in the silo, as the mouthpiece can be directed to any point. A large cutter, capable of handling from

25 to 30 tons an hour and driven by a fifteen-horse-power engine, costs from £60 to £80. Smaller machines may be driven by horse-gear or hand.

Though the time has hardly yet come when large Power-Shellers with a capacity of 100 bags or more an hour will be regarded as a profitable investment, a better type of small machine with force-feed, winnower, elevator and sacking attachment, is a desideration. The small hand-sheller is very wasteful of labour and the resulting grain frequently dirty. Where no husker or shredder is employed, a pattern of shredder which also strips the husk would be found advantageous and labour-saving. An opening exists for the organisation of a jobbing or co-operative industry in this and similar harvesting operations, whereby a single power-outfit with large capacity might do the work of shelling or shredding throughout a district possessing passable roads at a recognised rate per bag per hour.

TOPPING AND STRIPPING.

A practice which is gaining ground, in many parts of South Africa is that of cutting the stalks of the maize above the ears for stock feed, while in the southern United States it is customary to strip the leaves from the plant shortly before these begin to "fire" or wither. The question is frequently raised as to how far these operations influence the yield of grain. "The Pennsylvania Station found that by topping 1,050lbs. of stover were obtained at a loss of 540lbs. of grain. Mississippi Station, as the result of three years' trials, found a nett loss in feeding value of more than 20 per cent. Seven other stations show an average loss of thirteen bushels per acre, which was more than the feeding value of the fodder secured. Eight stations report a decrease of from 10 to 20 per cent. as a result of pulling."*

MAIZE HAY OR FODDER.

Where neither silage nor shredded stover can be prepared, the whole plant may be cured in the shock as hay and fed to stock as a combined roughage and grain ration. This fodder, however, is not so well relished nor so cleanly eaten as shredded stover or silage, and greater loss occurs in curing. The stage of development of the crop at the time of harvesting is in this, as in other cases, a matter of the first importance, and an effort should be made to cut at such a time as to secure the largest quantity of palatable and digestible fodder. An idea is very prevalent that no increase in weight or quantity of food substance takes place after the grain is "in milk," or fit for green roasting. This, however, is erroneous, for numerous careful experiments show that the plant continues to gain in weight of dry matter until fully mature, and that the most rapid gain is made while the grain is glazing.

* "Cereals in America": Hunt

WATER AND DRY MATTER AT DIFFERENT PERIODS.*

Stage of Growth.	Maize per Acre.	Water per Acre.	Dry Matter per Acre.
	Tons.	Tons.	Tons.
Fully Tasselled	9'0	8 2	0'8
Fully Silked	12'9	11'3	1 5
Kernels Watery to Full Milk	16 3	14'0	2'3
Kernels Glazing	16'1	12'5	3'6
Ripe	14 2	10 2	4 0

* Henry : " Feeds and Feeding."

From the above table it will be seen that the yield of dry matter has almost doubled after the grain had reached the milk stage, and that heavy loss would have resulted from harvesting the crop at that stage. Not only is the yield increased by allowing the plant to mature, but, contrary to general opinion, the resulting fodder is more digestible.

DIGESTED FROM 100 PARTS OF ORGANIC MATTER.*

	Maize, Hay, or Fodder. Average.	Silage. Average.
Cut before Glazing, 13 experiments	65 7	67'4
Cut after Glazing, 10 experiments	70 7	73 6

* Jordan : " Maine Exp. Station."

A modification of the principles adopted for the curing of grass and millet hay is therefore necessary, and the crop should be allowed to mature until the leaves begin to fall. A common method of hand-shocking is to tie the stalks of four plants together without cutting and then to shock the rest of the bundles around these; in other cases a three-legged wooden horse with one detachable limb is used as a temporary support. When the shock is finished a light rope with a hook at one end is used to draw the top together, when it is tied with a stalk or twine. The first shocks should be small, to hasten curing, and it may be found convenient to cut the field in alternate strips, adding the later-cut fodder to the outside of the partially-cured shocks. Curing may be furthered by leaving the crop in the swathe or small bundles for a week, for maize does not suffer to the same extent as grass-hay from dew or rain. Where stacking is contemplated, the crop should be field-cured for at least a month before carting, or heat and mould will almost certainly develop in the rick. The fodder is best fed to stock at nights, when the beasts will work it over, sorting out the ears and consuming a larger or smaller quantity of stalks and leaves.

SHREDDED STOVER.

The husker and shredder is having in the corn-belts of America an even more revolutionising influence on general agriculture than had the

silo. In South Africa but few machines are at present in use, and those lacking in the more modern improvements, which is to be the more regretted as the system undoubtedly obviates heavy losses of valuable feed which ensue wherever field-husking from the standing crop prevails. On an average 300lbs. of palatable shredded corn-hay or stover, worth from £3 to £4 a ton, may be secured for every muid of grain shelled. This may be baled and marketed, stored in a barn or put into a stack. The only precaution necessary is that the crop be thoroughly field-cured and dry before shredding, as the stover is otherwise liable to heat in the stack. As in the case of the hay-crop, cutting should be postponed until the grain is at least partly glazed, and the lower leaves begin to wither.

SILAGE.

Maize has done more than any other crop to popularise the cause of silage; it is the ideal silo plant, and breeders have devoted attention to its further improvement along lines calculated to give the best possible results when the crop is thus employed. As already stated, several of the local varieties, now in general cultivation, with a leafy, heavy-eared character, are eminently suited for this purpose. An average yield is about twelve tons of silage to the acre, though this is frequently much exceeded. As in the above cases, the crop should be allowed to approach maturity, when the yield of dry matter will be greater, the percentage of water less, and the silage sweeter. Formerly it was a practice to cut the maize when quite green, but of late years the desirability of waiting until the grain is glazed, or even dented, has been generally recognised. Ensiling increases the digestibility of the food, and especially of the fibre, and in this respect is a preferable process to field-curing. As an offset, however, there is always some loss from fermentation which varies with the maturity and water content of the crop. From the feeder's standpoint there is little comparison between the two, as the succulent character of the silage has, apart from its chemical composition, a markedly favourable influence on the milk-flow of dairy cattle and the carcass of butcher's stock.

Silage is generally cut into half or quarter-inch lengths. Some feeders, however, prefer one inch or one and a half inch cut, as they state that the smaller pieces are liable to cause soreness of the mouth in cattle, particularly if the material be hard. Shredded is considered by many to be better than cut silage in that it can be packed closer, and is in better condition for feeding. The difference between so-called sweet and sour silage is due to variations in the temperature obtaining during fermentation. All silage contains a certain amount of volatile acids, of which sweet silage contains a small proportion due to the existence of a temperature ranging between 130° and 160° F. The nearer maturity the crop, the greater is the chance of securing sweet silage, for the crop has a smaller content of water, which is associated with less development of acid. The amount of air present also affects the char-

acter of fermentation, and slow filling is sometimes resorted to with the object of increasing fermentation and raising the temperature. When power-plant is in use, however, this involves an undesirable delay. The higher the temperature up to a certain point, the sweeter the silage, but the greater the loss of food material, and it is therefore a moot point whether it be necessary to take any further precaution than to harvest the crop in a suitably mature condition, when all the silage will be palatable, although not necessarily "high temperature sweet." "There are six advantages in allowing the plant when intended for silage to arrive at the stage of maturity indicated: (1) Greater yield of water-free substance; (2) less weight to handle; (3) less loss in silo; (4) superior composition; (5) greater digestibility; (6) greater palatability; resulting in a greater feeding value per acre at less cost."*

SILOS.

In Great Britain, Europe and Australia, a general practice exists of placing silage in open-air stacks, pressure being secured by weights or rachets. Supporters of this system contend that the loss is no greater than the interest on a silo structure. In South Africa, however, it is a general experience that the losses have been very heavy, amounting in some cases to as much as 50 per cent. In addition, the labour involved in building a stack is very much greater than putting the same amount into a silo. Where this method is adopted, care should be taken to place the stack in a sheltered spot, as greater loss invariably occurs at the side exposed to prevailing winds. A wooden platform with rachets and wires attached at six points on the sides will be found a convenient structure.

Stone or cement-lined pits, which are a development of the most primitive form of silo, may be found at a number of centres in South Africa, and have given good results where provided with ample drainage. The greatest objection to this type is the difficulty of removing the silage for feeding, and fifteen to twenty feet is usually regarded as an economic limit to their depth. Where placed in the open, a hay stack is frequently built above the silage, after this is well settled, and assists in conserving the latter.

Of surface silos, which are now almost universally built in cylindrical form, there are three principal types, the wooden, the stone, and the brick. The choice of materials will in most cases be determined by their relative cost. The wooden silo is generally the cheapest, and it is to be hoped that wattle-wood after careful seasoning may furnish suitable timber for this purpose. In America, cypress, white pine, and Douglas fir are the chosen woods, and the silo is built of staves kept together by hoops, with a stone foundation and concrete bottom sunk to varying depth below ground level. Where building stone is cheap and plentiful,

* Hunt: "Cereals in America"

this may be adopted with the same foundation and base, and similarly strengthened by embedded iron bands. Brick silos do not commend themselves for local purposes.*

The size of the silo will depend upon the number of animals to be fed with an economic minimum of 24ft. in depth and 16ft. in diameter. A cow in milk should be allowed a ration corresponding to a cubic foot of silage per diem, and upon this basis the requirements of all stock upon the farm can be calculated. The following tables will furnish a guide when planning and building a cylindrical surface silo:—

NECESSARY DIAMETER OF SILOS FOR FEEDING DIFFERENT NUMBERS OF COWS WHILE REMOVING 2 TO 3½ INS. SILAGE DAILY (KING).

Number of Cows.	Silo 30 feet Deep. Mean Depth Fed Daily, 2 inches.				Silo 24 feet Deep. Mean Depth Fed Daily, 3½ inches.			
	Contents.		Round Diameter in Feet.	Square Sides in Feet.	Contents.		Round Diameter in Feet.	Square Sides in Feet.
	Tons.	Cubic Ft.			Tons.	Cubic Ft.		
30	108	4,091	15	12 x 14	108	5,510	17	16 x 16
40	144	6,545	16'75	14 x 16	144	7,347	20	18 x 18
50	180	8,182	18'75	16 x 18	180	9,184	22	20 x 20
60	216	9,818	20'5	18 x 18	216	11,020	24	22 x 22
70	252	11,454	22	20 x 20	252	12,857	26	22 x 26
80	288	13,091	22'5	20 x 22	288	14,691	28	24 x 26
90	324	14,727	25	22 x 24	324	16,531	29'75	26 x 28
100	360	16,364	26'5	24 x 24	360	18,367	31'25	28 x 28

* Detailed plans and specifications for silos of any of the above types will be gladly furnished by the writer to farmers requiring same.

(To be continued.)

Correspondence.

HELLEBORE FOR KILLING TICKS.

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

SIR,—In reply to your question, I use six of fat or oil to one of hellebore, in a liquid state. I generally use butter, for the simple reason that there is no sale for it down here, but it is one of the worst fats you can use, as it melts off too soon. I find rough cattle castor-oil the best and cheapest. You require a sticky oil which will remain on the skin and hair, and for that purpose you cannot beat rough castor-oil. Hellebore is apt to blister if made any stronger. It has served me better than all other remedies which I have tried.—Yours, etc.,

W. H. STAFFORD.

WHEN DID LUNGSICKNESS COME?

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

SIR,—I wonder if you or any of your readers can say (if the question is worth the trouble) at what time Lungsickness first occurred in Natal. Cachet, in his "Worstelstrijd der Transvaalers," gives as one of the causes that led to the abandonment of the Colony by certain of the voortrekkers in 1848 that the natives allowed their cattle, "often infected with the disease," to roam at large. I have had the impression that its introduction took place at a later period.—Yours, etc.,

J. Y. GIBSON.

Mahlabatini, 10th March, 1907.

[We regret to say that we have not yet been able to procure a satisfactory answer to the question. There are several old colonists who remember inoculating at the latter end of the Fifties. Any authentic information will be welcome.—Ed., *Agr. Jour.*]

HYACINTHS, ETC.

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

SIR,—Last year I planted some hyacinth bulbs, but did not succeed with them. I planted them in tins filled with good manured soil, and they started seemingly thriving well, but bore only a few stunted flowers, after which they decayed. Can you inform me of their proper treatment with regard to soil, watering, sun and shade, time of planting, and whether they can succeed in our climate, especially here on the Coast? Also, with regard to rearing them in water, whether hyacinth glasses are to be got here anywhere, and how the flowers are to be treated in them?

I would feel also grateful to you for your advice on treatment of Begonias and Gloxinias. Will Lilies of the Valley and Tulips succeed here?

Thanking you in anticipation,—Yours, etc.,

New Germany.

AMATEUR.

[Hyacinths were formerly grown with complete success at their nursery gardens in the Chase Valley by Messrs. Wilkinson. Messrs. Wilkinson say that they think the Coast climate may be too hot for successful hyacinth-growing. The soil should be good loam—say 1 part well decayed manure, 1 part leaf mould, and 1 part sand. In planting, cover the bulb half way up—to the crown, give no water until after growth has begun; the drainage should be good. Shelter is essential; also shade, but not such as that to be got from planting under trees.

For the other questions "Amateur" had best seek local advice. There are many in Durban competent to give it; Mr. Wylie, of the Botanic Gardens, would, we are sure, be pleased to give "Amateur" all the information wanted.—Ed., *Agr. Jour.*]

Gardening Notes for April.

By W. J. BELL, Nurseryman, Florist and Seedsman, Maritzburg.

FURTHER sowings for succession may be made of Cabbage, Savoy, Kale, Beet, Carrot, Lettuce, Radish, Turnip, Endive, Spinach, Mustard and Cress, and Onion.

All varieties of herbs may now be sown, such as Thyme, Sage, Marjoram, Savory, Parsley, Lavender, Rosemary, Rue, Wormwood, etc.

When only small quantities are required, the best plan is to sow in boxes or tins. When large enough, the young seedlings should be pricked out a few inches apart into a well-prepared bed of sandy soil, from which they may when larger be finally planted out into permanent quarters.

The Parsley may be sown in the open ground where it is required to grow.

Lavender thrives best in a poor, dry soil without manure, and must not be over-watered.

Plant out Cauliflower, Cabbage, Brussels Sprouts, Savoy and Celery.

The latter should be planted in trenches, which should be dug out not less than two feet in depth. Fill in with about 12 inches of good soil and well-decayed manure in equal proportions, and plant the young Celery plants nine inches apart.

Earth up as required Peas, Broad Beans, Cauliflower, Cabbage, etc.

During spells of dry weather give Peas abundant supplies of water, with occasional applications of liquid manure when commencing to pod.

Give Asparagus beds a good mulch of decayed stable dung after cutting down the old stems.

FLOWER GARDEN.

Sow all varieties of hardy flower seeds for winter and spring flowering. The hardiest and quickest to bloom after sowing are Candytuft, Calendula, Petunia, Sweet Alyssum, Pansy, and Dianthus.

Sowings may also be made of Aster, Aquilegia, Antirrhinum, Campanula, Carnation, Clarkia, Coreopsis, Delphinium, Eschscholtzia, Gaillardia, Godetia, Larkspur, Linum, Mignonette, Nicotiana, Nigella, Phlox Drummondii, Poppy, Salpiglossis, Scabious, Sweet Sultan, Ten Weeks and Brompton Stocks, Sweet William, and Wallflower.

Of the Poppies, the Shirley, Mikado and Giant Oriental are the best.

The flowers of the latter are of the most gorgeous colours, often six inches across, and grow to a height of three or more feet. The seed requires to be sown very thinly, and must, if necessary, be thinned out to two feet apart. The other varieties are more dwarf in habit, and may be left about a foot apart.

The seed of the Perennial Phlox should now be sown as it ripens, as it will not retain its vitality for long.

Freesia seed should be sown this month, and will flower in spring.

Daisy, Cowslip, Polyanthus, Primrose, Forget-me-not, Pentstemon, Carnation should be sown in boxes and carefully shaded and watered.

The planting of spring flowering bulbs should be completed this month, such as Anemones, Ranunculus, Narcissus, Daffodils, Bermuda Lilies, Freesias, Agapanthus, Gladiolus, Hyacinths, Ixias, Tulips, etc.

When planting Anemones dig the soil at least eighteen inches deep, and introduce a good deal of grit or sand, as they will not succeed in a stiff, cold soil. Light half-decayed manure is also required, when the plants will become a picture and the bulbs will improve for the following season.

Plant the bulbs about six inches apart and two inches deep. Be sure that the growing end of the bulb is planted uppermost. This is sometimes difficult to distinguish in the Anemone bulb. When planted upside down, which is not uncommon, much disappointment follows.

The depth which various bulbs require to be planted varies considerable, and failure often occurs through improper planting. The following instructions, which give the depth the crown of the bulb should be planted, may be taken as a guide:—

German Iris, one inch.

Anemone, nearly two inches.

Ranunculus, two inches.

Tulip, three inches.

Gladiolas, four inches.

Narcissus, two to three inches, according to size of bulb.

Liliums, Hyacinths and Amaryllis, four inches.

District Reports.

MTUNZINI, 28th February.—Since my last report the name of this Division has been altered to "Mtunzini," so much confusion having arisen with Umlalazi and Umlazi Division. The weather, on the whole, for this time of year has not been bad, and I am glad to say the mouth of the Umlalazi River still keeps open, consequently the mosquitoes are scarce. The hopper locusts are all well on the wing, and a great deal of damage has been done in the last three weeks—really it is cruel to see the way the crops have been eaten off in places. Mr. Ashby has started hay cutting on his farm adjoining the Town Lands here, and it is to be hoped he will be successful in the new venture. So far the Division still remains free from all cattle diseases. No horses died in this neighbourhood during the month.

C. C. Foxon, Magistrate.

NEW HANOVER, 15th March.—The worst hailstorm within the memory of the oldest resident passed over the Division of New Hanover on Thursday night, the 14th inst. It started near the Impolweni River and travelled towards the village of New Hanover, increasing in its violence as it advanced. At New Hanover the storm divided, one wing going towards the north and the other easterly. I have never known a hailstorm cover such an enormous stretch of country and do so much damage. There was a terrific wind accompanying the hailstorm, which accounts for its destructiveness, but the hail was also the size of pullets' eggs. The mealies, mabele, and kitchen gardens were devastated. Where there had been fields of beans looking most promising there was nothing to be seen after the storm had passed over. Poultry was killed, but, considering the violence of the storm, it is surprising what small numbers were killed. Several horses have died during the last month of Horsickness. I have heard of no deaths among cattle or other stock; all are in the best of condition. The locusts, I regret to report, in some parts of the district have completely destroyed the native crops. The sum of £444 has been collected in Poll Tax from Europeans up to date.

H. W. BOAST, Magistrate.

Alexandra Fibre Company, Ltd.

THE first general meeting of shareholders in the above Company was held in Messrs. Duff, Eadie & Co.'s office on Monday last at noon. Mr. F. E. Turner presided, and there were present Sir George M. Sutton, Messrs. D. A. Shaw, C. H. Stott, J. T. Taylor, A. C. Wearner, L. A. Keller, J. W. Buchanan, John Laird, J. M. Allan Hay, H. Baker, E. A. Hall, and others. The Chairman reported that an amended agreement had been come to with the vendor, Mr. N. Harper, whereby he accepted 4,040 fully paid £ shares in payment of the two farms to be handed over to the Company. He considered this a much more satisfactory arrangement than that at first proposed, as the Company would now have an unencumbered property, and the interest on debentures would be saved. It was proposed and carried that Sir George M. Sutton and Messrs. F. E. Turner, J. M. Allan Hay, and John Laird be the first directors of the Company, together with Mr. N. Harper as managing director. Mr. R. A. Dix was elected as auditor, and the directors were instructed to complete and register the articles of association and to take transfer of the property. It was further resolved that the directors be empowered to issue the reserve shares to the extent of one thousand to approved applicants at not less than par, and up to any date before the next annual general meeting. This concluded the business. At a meeting of the directors held immediately afterwards, Sir George M. Sutton was elected Chairman of the Company, and Mr. F. E. Turner Deputy-Chairman.—*Mercury.*

Immunisation of Mules against Horseshickness.

THE following, by Dr. A. Theiler and Mr. C. E. Gray, respectively Government Veterinary Bacteriologist and Principal Veterinary Surgeon, Transvaal, appears in the current issue of the *Transvaal Agricultural Journal*:—

The fact that rendering an animal immune gives him a certain protection has served as a basis for the inoculation against this disease (horseshickness), which was introduced into practice over a year ago, and we are now able to immunise mules against horseshickness by a simultaneous inoculation of serum and virus, but we have not yet been able to apply the same method with equally successful results to horses. It seems that the mule, although as susceptible to the disease as the horse, more quickly recovers than the latter, and it is evident that the factor which helps him is due to some inherited power of resistance transmitted by his sire, who, as we know, although susceptible to horseshickness, very seldom dies from it.

This method of inoculation has been applied during the last year to some 3,000 mules in all parts of the Transvaal and Rhodesia. The results have been very satisfactory, and total loss from the inoculation having only amounted to 3.8 per cent. We have every reason to believe that it will be possible to improve this inoculation at some further period, and also to reduce the mortality to almost nil.

Since the introduction of this method, horseshickness has been very virulent in various parts of the country, and our mules have stood a very severe test, with the result that only 6 per cent. of the immunised mules again contracted horseshickness. The fact has been the starting point of a new series of experiments, which have confirmed the observation that animals may contract horseshickness more than once, and the so-called "aanmaning," or relapse of a healthy horse or mule, is no longer a doubtful phenomenon. Various strains of horseshickness virus have been collected, but experiments have been made more especially with three, and the fact remains that equines, although immune against horseshickness, may be reinfected twice, three times, or even more. We are not able to break down the immunity of a mule or horse by the injection of such enormous quantities of virus into its system as is necessary to kill 10,000 horses, provided that the virus used in the test injection is of the same kind against which the animal was immunised; yet we are able to overcome the immunity with a comparatively small quantity when the virus is of a different strain. There are accordingly in South Africa various strains of virus of horseshickness, all of which are similar to each other, but differ in the respect that immunity obtained from one strain does not protect against another strain. This explains the varying virulence of the disease of different districts and localities, and is of great importance, and the discovery of this fact was a severe set back to our work, because we find it is necessary to devise a method of immunisation which will protect animals against all strains of virus, a task which hitherto we have not been able to accomplish completely.

but as only .6 per cent. of mules have died in practice after inoculation, it seems that our virus is probably of the type which is most common in the Transvaal, although there may be certain strains against which our virus may not be strong enough to protect, therefore our method of immunisation will only be perfect when we are able to protect animals against all the different virus encountered in South Africa. Meanwhile we are continuing to immunise with the strain of virus which is most commonly found.

Veterinary Departmental Reports for Month of February, 1907.

MINISTER OF AGRICULTURE,—

I forward herewith my monthly report for the month of February:—

Sheep Scab.—During the month ten licenses were raised:—Estcourt, 1; Umvoti, 8; New Hanover, 1.

Seven flocks were placed under license:—Klip River, 1; Weenen, 1; Umvoti, 1; Krantzkop, 1; Lion's River, 1; Ixopo, 1; Harding, 1.

Fifty-four flocks are still under license.

With reference to sheep entering over our Borders under the Amended Scab Act. As regards sheep entering for *bona fide* winter grazing, it is hoped, subject to your approval, that sheep entering from the Cape Colony, Orange River Colony and Transvaal coming into districts of Natal used for this purpose, we shall be able to arrange with the respective Colonies for their entry and return, subject to their being inspected and certified by a Government Veterinary Surgeon or Stock Inspector of the Colony they are leaving that they are free from Scab and have been inspected within ten days of crossing the Border. The Chief Inspector of Scab, Cape Colony, has signified his approval of this in so far as Alfred County is concerned, and the Principal Veterinary Surgeon, Transvaal, in so far as Utrecht and Vryheid districts are concerned, and it is hoped that the Orange River Colony authorities will see their way to fall into line as regards Klip River County.

East Coast Fever.—During the month 14 fresh outbreaks of this disease have occurred, as follows:—

Vryheid district, one farm became infected, viz., Tractaat.

Ngotshe district, two farms became infected, viz., Waterfall and Langerwacht.

In Umvoti district one fresh outbreak on the farm Krantzkloof, which was undoubtedly an extension of the disease from the farm Bon Accord.

In the Dundee and Umsinga districts six fresh centres of the disease, viz., the farms Zwaartwater, Rooifontein, Knostrop, De Vryheid, Pomeroy Town Lands, and the Oscarsberg Mission Station.

In Zululand four fresh outbreaks occurred, one at Nqutu and two in the Nongoma district, and one at Eshowe.

In the Stanger and Mapumulo districts the whole of these two districts are looked upon as infected areas, and all more or less infected. The disease is gradually spreading over the whole of these districts.

In Durban County no fresh centres of infection were reported during the month.

In the Vryheid and Ngotshe districts, although only three fresh farms were reported to have become infected, the spread of the disease has been gradual and sure, and we can, I think, expect to see many more farms become infected during the next few months before the winter sets in.

Babanango district, which is looked upon as part of the Vryheid district, is still free from infection; and the public of that district are rendering us all support possible in endeavouring to prevent the ingress of cattle.

Regarding the fresh outbreak in Umvoti County, only one animal died. The outbreak occurred in a paddock adjoining an infected paddock on the farm "Bon Accord." The animals concerned in this outbreak have been removed on to clean veld, passing through temperature camps. It is hoped that in Greytown and Krantzkop districts we shall be able to modify the restrictions on the entire prohibition of movement of cattle when the infected areas have been completely fenced, and when the fence around the locations in these districts have been completed. It is hoped that the locations and infected areas fences will be completed at an early date.

With reference to the outbreak in the Dundee and Umsinga districts, the seventh outbreak shown in Mr. Bruce's report occurred on the farm "Vergelegen," and, as this farm was reported as infected on the 4th September, 1906, I am not showing it as a fresh outbreak in my report. You will see from the report of Mr. Bruce that all these fresh outbreaks occurred on farms adjoining infected areas, with the exception of one on the Pomeroy Town Lands.

In Zululand one fresh outbreak occurred in the Nqutu district, but, as you will see from Mr. Bruce's report, he also suspects the existence of the disease at Neeneeni Mountain and at Isandhlawana. The source of infection of these outbreaks is traceable to loot stock, and there is no doubt that, owing to the nature of the country in these districts, the disease will continue to spread there. The outbreak shown at Eshowe occurred amongst some cattle which came from Nqutu under permit from the Magistrate, as provided under the regulations, and left that district before the recent outbreak occurred there. Among the five head which went to Eshowe one animal was noticed to be sick a few days after arrival, and died shortly afterwards. This was a positive case of East Coast Fever. All the animals in the area over which these cattle grazed in Eshowe have been removed through a temperature camp; but there

is a possibility that the beast referred to might have been capable of infecting the veld before arriving at Eshowe, as four days after its arrival it was found to be visibly sick. The other outbreak occurred in the Nongoma district. Apart from these two outbreaks, which occurred outside the flagged area, there have been 28 fresh in-contact troops of cattle showing cases of East Coast Fever amongst them. One fresh outbreak occurred on the south side of the Black Umfolosi and the other outside the infected area of Nongoma, towards Hlabisa. A fresh suspicious case occurred in the Hlabisa district, which was not shown to be definitely a case of East Coast Fever last month, but we have positive evidence this month.

In the Paulpietersburg district the temperature camp system is still being adopted. The disease appeared amongst a fresh troop of cattle on an already infected farm during the month, and these cattle were removed.

Deaths from East Coast Fever during the month were as follows:—

Stanger and Mapumulo	1,345
Umvoti	6
Durban County	60
Vryheid and Ngotshe	375
Dundee and Umsinga	51
Mahlabatini	74
Paulpietersburg	48
Nongoma and Hlabisa	836
	<hr/>
	2,795

In the Stanger and Vryheid districts, which includes Ngotshe, the deaths shown are only approximate, and they undoubtedly are in excess of those shown.

With reference to the branding of cattle in the infected areas, this has been completed in the infected area of Umvoti County, and will in a few days be completed in the infected area of Weenen County also. In Dundee, Stanger, Paulpietersburg and Durban County it is also being proceeded with. In Zululand arrangements are not yet completed for enforcing this.

From the above returns of deaths reported, you will see that the total mortality from East Coast Fever during the month was approximately 2,800, but probably it would be nearer 4,000. In view of this high mortality, it is to be regretted that individual owners did not see the policy of disposing of their cattle from infected districts for slaughter purposes, whereby both themselves as individuals and the country as a whole would benefit to the extent of the value of such stock for butcher purposes in place of total loss. Of course, many of these owners are natives, who hold quite original ideas regarding disposing of their cattle, particularly if the amount they are to receive for them is problematical.

Lungsickness.—During the past few months this disease has made its appearance in Weenen and Umvoti Counties. Up to May last only one centre of infection existed in the whole of Natal, viz., in the Ngutu district of Zululand. The outbreaks which have occurred in the two above-mentioned counties occurred amongst cattle which had been on Militia transport in Zululand. In the case of the Umvoti cattle, although the outbreak was not known to exist until January, deaths, I understand, had occurred and were not reported, prior to this. The several centres of infection in the Greytown district now existing emanated from the one common source of infection, viz., Mr. P. R. Nel's cattle, and at present eight separate troops of cattle in this district are under license for Lungsickness.

During the month 24 deaths have occurred in Umvoti County from this disease, and, having regard to the fact that this district has been free from this disease for a considerable period, the cattle there are highly susceptible both to the disease itself and to the effects of inoculation, and we must, in consequence, maintain a firm hold over the quarantine on these cattle to prevent any possible extension.

It is much to be regretted that our Lungsickness Act does not provide for a longer period of quarantine than six weeks, as it is a fact that the incubation period of this disease may extend to three months, and therefore it is to be regretted that the Act does not provide for the destruction of all cattle which may recover from this disease, as there is no doubt that recovered animals are a source of future infection. In so far as my Department is concerned, however, we shall refuse to release from quarantine any animals which we know to have recovered from the disease, as we can rightly claim that they are still in a diseased condition, which can be proved at any time by *post-mortem* examination. It is therefore urged that both in the interest of the owners and the public those possessing animals which may recover from Lungsickness should dispose of them as soon as possible for butcher purposes.

Lungsickness is at present very prevalent in the Cape Colony, particularly in the native territories of the Transkei, and there is no doubt we shall have at an early date to take protective measures against the introduction of this disease into the Western districts of Natal. This is particularly necessary, having in view the fact that these districts have been free from this disease for years, and the cattle are, in consequence, highly susceptible, and the introduction of this disease would be attended with considerable mortality.

Horsesickness.—The mortality reported from this disease is truly alarming, and is, as was anticipated from all quarters this season, proving a record one, and appears to be one of those which visits even the recognised healthy horse districts periodically after a lapse of a number of years. There can be no doubt that the excessive rainfall after seasons of apparent drought has exercised a very considerable influence over the present prevalence of this disease. We may say at the present time that

we are practically at the height of the season, and the mortality will continue and probably increase until early in May. It is known that the months of March and April are invariably those during which the mortality is highest, and, further, when this disease is prevalent in the up-country districts the coast districts appear to be suffering less, but I think the fact is that the usual mortality is taking place, but is masked by the unusual mortality occurring up-country.

During the past three months we have been busy in Maritzburg and Durban inoculating mules against Horseshickness. In Maritzburg, as you will see from Mr. Power's report, 210 mules have been inoculated, with a loss of 3 per cent. In Durban, 541 mules have been inoculated, with a loss of 39 animals as the result of inoculation. This loss principally occurred amongst the first batch of 75 mules inoculated, where a loss of 16 animals occurred. The virus was found to be too strong, and was abandoned in consequence. In connection with this particular virus, it is remarkable that the same virus was used in the Transvaal with great success, only 9 mules dying out of a total of 400 inoculated. The virus we then resorted to with much better results was the same strain as the above mentioned, but came from a mule, whereas the other came from a horse.

We have now issued many immunised mules all exposed among others night and day in badly infected Horseshickness locations, and so far we have lost one animal showing positive signs of Horseshickness, and this mule had been running with a hundred others near Maritzburg night and day; none of the others have shown any signs of sickness. As Mr. Power points out, in the Transvaal they have lost 17 mules out of 5,000 after immunisation.

There is no doubt that this year will be a most severe test to the immunity conferred on mules by this method of inoculation, and I have no hesitation, from the practical experience of the Transvaal, in anticipating that the results of this exposure will be satisfactory. We know that individual animals will die of Horseshickness, or get sick and recover after being inoculated when exposed to infection stronger than the virus used for inoculation purposes, but, taken in the aggregate, as proved in the Transvaal, these losses will not be of any serious account. Of course, an individual owner who may be so unfortunate as to be singled out to lose an immunised mule will consider that his case is a hard one. In this connection, we shall be very glad if any owner of an immunised mule losing an animal, or has one sick from what he thinks is Horseshickness, will send us a small quantity of blood (2 or 3 ozs.) We can then satisfy ourselves if it is a case of this disease, and we are particularly anxious to obtain blood from such animals, as the strain of virus will prove to be stronger than in ordinary cases. I put up return of deaths from Horseshickness, and it is interesting, showing the mortality from the various districts. These are not the total deaths, only those actually reported, and probably the true estimate would be nearer 500:—

Newcastle	11
Greytown	30
Vryheid	25
Port Shepstone	40
Pietermaritzburg	150
Durban	35
Dundee	10
Mooi River	34
Ladysmith	4
Underberg	12
Paulpietersburg	6
Nongoma	8
Lion's River	4
Eshowe	5
Melmoth	2
Mahlabatini	3
Ixopo	1
Umlalazi	1
Verulam, a few cases reported.	

Total	381
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Blue Tongue in Sheep.—As a rule, with a season such as the present, showing a great mortality from Horsesickness, Blue Tongue in sheep is very prevalent. They appear to be recognised as two diseases, being in all probability the same medium of contagion, and conditions favourable to the one are favourable to the other.

The return of deaths put up is not claimed to be anything more than approximate, and there is no doubt that the actual death-rate is very much in excess of this. With a year such as the present all sheep-farmers will realise the necessity for inoculation against this disease, which should be carried out early in the summer before cases of the disease occur. To adopt the system of inoculation when the disease is causing considerable mortality is very unsatisfactory, and apt to bring the system into ill-repute.

DEATHS REPORTED FROM BLUE TONGUE IN SHEEP.

Utrecht	250
Vryheid	100
Pietermaritzburg	40
Mooi River	50
Ladysmith	10
Ixopo	60
Paulpietersburg	50
Total	560

I put District Veterinary Surgeons' and Stock Inspectors' reports.

S. B. WOOLLATT,
Principal Veterinary Surgeon.

STANGER.—D.V.S. DONALDSON.

East Coast Fever.—Total deaths from East Coast Fever in Lower Tugela and Mapumulo districts (reported) from 2nd February to 2nd March, 1,345. Total number of cattle railed for slaughter, 103. This is irrespective of the Militia oxen at Bond's Drift, which have all been railed and the camp closed. I have also closed down the last Otimati Camp, and handed the natives their cattle back. I have started branding cattle at Mapumulo and Chaka's Kraal, and am awaiting brands to start at Durnall, Tugela, and New Guelderland. I have placed a quarantine officer in command of the Tugela Border from Bond's Drift to Bulwer.

NEWCASTLE.—D.V.S. HUTCHINSON.

Glanders.—A case of Glanders was reported from Utrecht in a horse belonging to W. Muller. This animal died of the disease, but I was able to make a post-mortem, and found extensive lesions both in the nostrils and the lungs. This animal had been in contact with five others, which I submitted to the Mallein test. One of these, a brown gelding, reacted, and was destroyed, glanders lesions being found on *post-mortem* examination. This animal was an N.D.M.R. horse, and was insured in the Militia. It is quite possible that the infected horses may be found to have been in contact with other horses before purchased by Muller, and inquiries to this effect are still being conducted, and, if found to be the case, the other in-contacts will be tested. Besides the above, a further number of 24 mules and 8 horses were subjected to the Mallein test.

There are no other cases of contagious or infectious disease of any serious nature to report.

From two to three hundred sheep are reported by the Stock Inspector at Utrecht as having died of Blue Tongue, and it is to be hoped that owners where the percentage of deaths are heavy will avail themselves of the opportunity of securing vaccine for the purpose of inoculating against the disease.

This district has so far been exceptionally free from Horsesickness, only 11 deaths having been reported during the month.

GREYTOWN.—D.V.S. CORDY.

Scab.—One outbreak only has occurred during the month.

Lungsickness.—Four fresh outbreaks have occurred during the month in the Inadi portion of the Krantzkop Division. The source of infection is thought to be the transport cattle of Mr. P. R. Nel. These fresh outbreaks are all among native cattle in the Inadi Location, and I therefore anticipate many more outbreaks before the disease is stamped out.

In all about twenty-four deaths have occurred. Three of the troops

have already been inoculated, and the fourth will be done as soon as suitable virus is procured.

East Coast Fever.—One fresh outbreak has occurred on farm Kranskloof among a troop of eighty cattle. One cow died, and the remainder have been temperatured and sprayed and removed to clean veld, where they are being put through a temperature camp. The site of this outbreak is a paddock on the west of the Greytown-Muden road, and adjoining the infected paddock of Mr. Edwards, at Bon Accord. During the month six deaths occurred in the infected area. Native guards have been stationed on all the roads leading from the infected area to prevent cattle from straying into or out of this part of the Division. All cattle in the infected area are being branded as fast as possible, about three thousand having been done at the end of the month.

I visited this area during the month with the Magistrate, who addressed a large meeting of the natives, explaining the nature of the disease, the regulations in force, and the reasons for same.

Horsesickness.—About thirty deaths among horses and five among mules were reported during the month.

Twenty horses were examined for the Militia during the month.

Several convictions have been obtained for breach of regulations in connection with East Coast Fever, and others are pending.

VERULAM.—D.V.S. McNEIL.

Contagious disease has been limited to Horsesickness and Biliary Fever among horses.

East Coast Fever has claimed no further victims in the district during the past month.

My time has practically been taken up in getting round and finding out my district. I have made a tour of inspection of the native guards, the loot stock at Ndwedwe, the quarantine officers, etc.

VRYHEID.—D.V.S. BECKETT.

Horsesickness.—This disease has been very prevalent in the district under my charge; 25 cases have been reported, but this does not give any idea of the actual mortality during the month, which must have been at least double this number.

Blue Tongue in Sheep.—100 cases reported.

East Coast Fever.—The spread of the disease has been gradual, but none the less sure. Only three fresh outbreaks have been reported. Babanango district is still, so far as we know, clear of this disease, and if the quarantine line is strictly maintained along the Vryheid border there is little danger from that zone. The difficulty of guarding a line of this nature about 100 miles long with a small staff is great, and quarantine could doubtless be broken by anyone determined to get cattle through. Discovery would follow too late to be of use. I consider that rigorous

measures should be at once adopted in case of any suspicious movement, and any cattle found inside quarantine zone should be destroyed immediately. A lesson of this kind may insure strict herding of kafir cattle near the boundaries, and possibly prevent contemplated movement.

PORT SHEPSTONE.—D.V.S. TYLER.

East Coast Fever.—As regards East Coast Fever there have been no fresh developments, and things are so far in a most satisfactory condition. The Cape border has been thrown open to cattle from Alfred County, and the guards have been removed from the Umzumbe to the Umzimkulu River.

This has been a very bad month for Horsesickness, nearly forty deaths having been brought to my notice.

The health of stock in general has been good.

MARITZBURG.—D.V.S. HARBER.

Sheep Scab.—Three flocks of sheep are under license for this disease.

Mange.—A few cases are in quarantine for this disease in horses and goats.

Blue Tongue in Sheep has been the cause of about 40 deaths in the Richmond district.

Horsesickness has been very prevalent, upwards of 120 animals having been buried in February in Maritzburg. Several cases, about 30, are reported from the surrounding districts.

Mallein.—Sixty-three mules and six horses have been tested with Mallein.

Forty-five mules have been subjected to the immunising process against Horsesickness. Of these two were private mules.

Biliary Fever.—One case of this disease was treated and recovered.

A cow was treated for evagination or eversion of the vagina, due to weakness. The subject was a Cape cow due to calve very shortly. The organ was replaced and kept in position by a truss, and tonics were administered. I understand she has since calved without difficulty.

DURBAN.—D.V.S. AMOS.

The importations by sea have been as follows:—

Sheep	6
Dogs	10
Horses	57
Goats	3
Total	76

The sheep came from England, Australia, and Germany. Dogs

from England. Horses, 50 from Australia, and seven from England. Goats came from England.

Glanders.—Thirty-nine horses have been tested, and eight donkeys. One horse and two donkeys reacted and were destroyed. All these reactions were animals recently arrived from the Transvaal.

Horsesickness has been very prevalent indeed, especially in the Pine-town and Sydenham districts; approximately, 35 deaths have resulted, the majority dying from the pneumonic form.

East Coast Fever.—This disease has remained well in hand, one fresh outbreak only occurring, and that within the original infected area.

Sixty animals have died from this disease.

Biliary Fever.—Several cases of this disease have occurred, and one valuable horse has died. The other cases have recovered under treatment.

During the month I have been fully occupied immunising nules, grading cattle at Jacob's, and general supervision.

DUNDEE.—D.V.S. BRUCE.

East Coast Fever.—In the Dundee-Umsinga area seven fresh outbreaks occurred, the majority of these being traceable to sick cattle, having been travelled from the distributing centre in this area, namely, Weltevreden. The outbreaks occurred on farms adjoining infected areas, with the exception of the one at Pomeroy Town Lands, and the farm Vergelegen, the latter being due to cattle straying back on to infected veld, but also adjoining infected veld. The names of the farms on which these outbreaks have occurred are as follows:—Stockholm, Zwartwater, Giba, De Vryheid, Knostrope, Rooifontein, Vergelegen, and Pomeroy Town Lands. Some of the owners have disposed of some of their cattle for slaughter purposes, and the remainder are in temperature camps. With the exception of the outbreak on the Pomeroy Town Lands, these outbreaks do not make any great difference to the actually infected area here, and the fencing in of same is still being proceeded with. About four months ago the greater part of Pomeroy Town Lands was cleared of cattle, and the clear veld is being used for the treatment of cattle in this vicinity. The Dundee Town Lands have been cleared of cattle, about 50 head being placed in a temperature camp, the remainder being sold or confined to the owners' fenced in erven. A few cattle in a paddock adjoining the Dundee Town Lands remain infected. Originally the number in the paddock was thirteen head, seven of which now remain, but the owner is informed that his cattle will be cured as they get sick. A gentleman in this town has treated eight known cases of East Coast Fever on the Town Lands. Seven of these have died, and the one appears to be recovering, but it was on a fair way to recovery before his treatment was adopted. He is said to have treated several other cattle, all recovering, but the cases mentioned above are the only

positive ones which he has treated that I know of. In the Nqutu district outbreaks of East Coast Fever exist at Vant's Drift and Nqutu, and in my opinion also at Neeneeni Mountain and Isandhlawana. The source of infection in these cases is traceable to loot stock, with the exception of that at Vant's Drift, which is due to oxen working on Royston's transport. Nqutu district is practically an unfenced native location, and we may expect further outbreaks in this district. Temperature camps here are out of the question, and the natives will not sell their cattle unless the sale of these is made compulsory. At the present time in the Dundee-Umsinga district the department is spending a large sum of money in guarding, temperature camps, etc., but the value of this work is very much lessened by not being able to deal in a proper manner with these fresh outbreaks. Those farmers in the Dundee-Umsinga and Utrecht districts whose farms are properly fenced in stand every chance of not getting East Coast Fever amongst their cattle, but the outlook for the others is a serious one. The number of deaths from East Coast Fever during the month is 51.

Lungsickness.—One fresh outbreak in the Umsinga district, and the cattle have been quarantined and inoculated. Number of deaths during the month, 11.

Redwater.—Ten deaths.

Gallsickness.—Fifteen deaths.

Quarter-evl.—Four deaths.

Horsesickness.—Ten deaths.

Other Causes.—Thirty-two deaths.

Scab and Mange.—Several flocks are under license, especially in the Nqutu district.

MOOI RIVER.—D.V.S. VERNEY.

East Coast Fever.—This disease has been somewhat quiescent during this month, but this was to be expected, as it is too early for the ticks that have dropped from the previous sick animals to have completed their moulting. I anticipate more deaths during the ensuing months. The fencing is progressing, and the whole of the infected pasture is now enclosed with a good barbed wire fence, and this, combined with the branding of the cattle on this infected area, will, I hope, be instrumental in confining the disease to its present position. Mule wagons have been working during the month from Mooi River to Middlerust, as all ox transport has been prohibited in this area.

Horsesickness.—This disease has occurred to a somewhat alarming extent on some of the highest farms in the Mooi River district, and commencing so early in the season it is certainly suggestive of a much worse period before the advent of frost. It is noteworthy that on all these farms where the disease has appeared mosquitoes have abounded in enormous quantities. On some of the farms where horses have died there have

been no cases since 1893, and it would be interesting to know where the infection has been during this interval. It is to be regretted that the organism of Horsesickness is not demonstrable, as then it would be comparatively easy to follow, especially assuming the mosquito is the carrier. In all probability the organism sporulates, and these spores are capable of lying dormant until certain conditions exist which are necessary for their introduction into the animal body, simulating Anthrax spores, etc.; 34 deaths are reported.

Lungsickness.—During the month the licenses from all contact animals on western commonage were raised. Mr. Bird's herd is now under license for another six weeks owing to an ox developing the disease and recovering.

LADYSMITH.—D.V.S. WEBB.

Ladysmith and Bergville districts appear to be very free from diseases of all kinds. There have been only a few cases of Horsesickness up to the present; a mild form of Blue Tongue in sheep is reported from Bergville district.

Scab.—No sheep are under license in Bergville district. In Ladysmith district two flocks are under license.

Immunisation of Mules in Natal.

To Dr. Theiler belongs the credit of having discovered a practical method of inoculating mules against Horsesickness.

This method, now being carried out in Natal, has been very largely practised in the Transvaal during the past couple of years, and with success, as proved by the fact that inoculated mules are now living in districts so unhealthy, that it practically means certain death for any uninoculated mule taken there. When in Pretoria a couple of months ago I was given—thanks to Dr. Theiler—every facility for making myself familiar with the operation and all the details of the process, and during that time I learnt how highly this work was appreciated by the farming community. In fact so pleased were they with the results obtained previously that I believe every farmer who keeps a mule in an unhealthy locality has it inoculated. The principle of the system is the simultaneous injection of virus and serum. At present it is only applied in practice to mules, but it is hoped that a method of inoculation may be perfected for horses at an early date.

Over 200 mules have been inoculated in Maritzburg, and 3 per cent. have died from the disease whilst undergoing treatment, i.e., during the period of twenty-one days after inoculation. Animals are not allowed to work during this period. The majority of those mules have now

been issued and are working in nearly every Horsesickness area in Natal, and some are also in Zululand, and as the disease this season is exceptionally virulent and almost general throughout the Colony the immunity conferred will be put to a severe trial. If those animals can withstand the infection of this season, and all practical evidence from the Transvaal goes to prove that they will, there is no doubt that the method will be very largely adopted in Natal in future. Of the 200 mules discharged from here as immunised only one death has occurred so far from Horsesickness, and this animal had been running night and day with about 100 others in a very unhealthy part and at the time when the majority of the horses died in that locality although stabled. It has been proved both experimentally and in practise that the virulency of Horsesickness infection varies in different districts, and animals immune in one district may contract the disease in another, *i.e.*, a stronger infection exists in some districts than others. For example, mules may be immunised in Maritzburg with virus obtained locally. Those animals would then be immune here, but if taken to Zululand or elsewhere may encounter a stronger virus and contract the disease.

This experience is known in practice with horses that have suffered from the disease in one district and known to be "salted" there, but when taken to another locality have contracted the disease and died. The aim then is to obtain a virus that will not cause too high a mortality during the process of immunisation but which will confer an immunity capable of withstanding any infection likely to be met with. Dr. Theiler has informed me that out of 5,000 mules inoculated this season seventeen have died from Horsesickness after being discharged. When it is considered that those animals are all living in Horsesickness districts and many of them running at night it will be seen that the "break downs" above referred to are rare, but as such cases are liable to occur it is well that those interested should be aware of it.

W. M. POWER, D.V.S.

Maritzburg.

Importation of Trout.

THOSE who have followed the successive steps taken for the introduction of trout into the streams of Natal will be interested to hear results of the last importation. Much of our trout ova has hitherto been imported from the hatcheries in Cape Colony, but another attempt has just been made to import ova direct from Britain.

At the beginning of the year two cases, each containing 15,000 brown trout ova, were obtained from the Howietoun Fisheries Co., Sterling, Scotland, and consigned by the Agent-General to Natal. They reached

Durban about the middle of February in good condition, not more than 400 of the eggs having died in transit. One of the cases was consigned direct to Mr. Drummond's farm, Allerdean, Ingogo, where hatching boxes had been constructed in readiness to receive the ova. The second case was sent to Mr. J. C. Parker's hatcheries at Tetworth.

In spite of great care taken in handling and unpacking these cases, and adjusting the temperature of the water, the ova have all perished.

Mr. Parker ascribes the want of success attending this latest experiment, as compared with earlier attempts, to import trout ova, mainly to the changes of temperature experienced by the ova. In 1890-1892 the hatching boxes were in the bush on Mr. Hutchinson's farm, Boschfontein. The stream that supplied the water, Mr. Parker says, never rose above 61 deg. Fahr., which is 11 degrees cooler than the stream at Tetworth. In the year 1890, 40,000 ova were imported, from which 1,442 fry were hatched, equivalent to 3.5 per cent. In 1891, 75,000 ova were imported, from which 3,363 fry—or 4.4 per cent.—were hatched.

"From past experience it can be clearly shown," Mr. Parker writes, "that the best results are to be gained by importing ova from Cape Colony, where they are gathered in the winter. Then they have no sudden shocks and changes of temperature to suffer, the stream here (Tetworth) having a temperature of 48 deg. in the month of August."

This is shown by the fact that in 1899 fry representing 42 per cent. of the ova imported from Cape Colony were hatched at Tetworth and were placed in streams in Natal.

Sack-Filling and Weighing Machines.

THE probability of an abnormal mealie crop this season, and the consequent prospects of a large export trade being done, suggests the desirability of economy in the handling of the grain. The attention of the Department of Agriculture has been called to various apparatus designed for the filling of sacks, weighing, etc. One of these is Abery's patent automatic weigher, which will weigh into sacks any given net weight of grain and keep a tally of the number of sacks weighed. This saves considerable time in filling sacks, and also obviates the extra handling for weighing and tallying into railway trucks. Another of these machines is a patent sack-filling and weighing apparatus. This also fills sacks to any given weight of grain, and keeps an account of the number of sacks filled and weighed. The mealie-silo of Messrs. Lawes, Maritzburg, is provided with automatic scales; see page 333, Vol. V. Such machines as these, though naturally expensive, would probably be valued by co-operative and similar associations, and might be purchased by the collective funds of the members. Particulars regarding agents, prices, etc., of these machines may be had on application to the Department of Agriculture.

Natal Fruit in London.

PACKING OF PINEAPPLES.

IN connection with the experimental consignments of fruit which were despatched recently for the South African Exhibition in London, the Minister of Agriculture has received a preliminary report from the Agent-General relative to the shipment of pineapples.

The pines, which were carried as deck cargo, were unfortunately nearly all in an unmarketable condition when opened. Many of them, though outwardly of good appearance, were found to be badly discoloured when cut open. The pines which were sent in cold storage were in much better condition. Both deck and cold storage pines were, however, too mature.

The Agent-General emphasises the necessity for leaving a fair portion of the stalk on each pine, and adds that the pines which were received in the best condition were those in which this course had been adopted. The Agent-General's opinion has been confirmed by the leading fruit brokers whom he has lately seen. It does not appear necessary to seal the stem, as was done in one case.

Another noticeable fault in connection with the pineapples consigned to England was that of excessive packing. In some cases, the Agent-General states, an additional layer of pines could have been inserted without any harm being done.

Care should also be taken to have cases marked "This side up, with care," as in many cases the tops of the pines had been badly crushed owing to the cases being kept upside down during the voyage.

The Cultivation of Chilli Peppers.

How the Plants are Grown.—A hot bed is made by excavating about 16 inches deep; fill in to within 4 inches of the top with damp stable manure, tramping down very solidly. Spread about 4 inches of sandy loam over the manure. The seed is sown quite thickly over the loam, and then about $\frac{1}{2}$ inch of loose sand soil placed evenly over it, and all kept damp. When the plants have two or three leaves, thin to 14 inches apart each way. The plants must be watered while in the hot bed by sprinkling. Great care should be taken to protect from frost.

Soil and Preparation.—Rich sandy loam is the best for the chillie pepper. It should be ploughed deeply, and be put in a state of thorough cultivation. Ridges should be made 3 feet apart, and the plants set 2½ feet apart on the ridges. All plants must be on a water line, and to get this the ridges should be made, water run down the furrows, and the plants about two inches above the water-mark. This insures every plant receiving water when irrigated. Plant as soon as danger from frost is over.

Cultivation.—Frequent cultivation is necessary until the plants get too large to allow of a cultivator and horse passing between the rows. All weeds must be pulled out. When the plants are set as above noted, all the ridges will be on one side. This must be worked down with a cultivator, and then a plough used to throw earth on either side of the furrow, so that the plants will be midway on the ridge.

Irrigation.—While the plants are small, water will be needed about once in 20 days, but as they get larger it will be needed as often as once a week, though only in small quantities. The plant seems to have no deep roots; consequently, the surface soil must be kept damp.

Picking.—The field should be gone over about once a week after the peppers begin to ripen, all that are fully ripe being taken off. Great care must be exercised to pick all the stem with the pepper. They should be allowed to lie in the sun one day after being picked, in order to toughen the stems and prevent them breaking during the process of curing.

Stringing.—The common method is to cut strings of strong, smooth twine 8½ feet long. Draw this through a needle about 12 inches long, which is often made of a bicycle spoke. Peppers having any break or blcmish must be thrown away, as they would decay before drying properly. Of course, where an evaporator is used these can be saved. After the strings are full and tied they are hung on nails driven into a rough pole or other framework, standing about 6 feet from the ground, and left until dry; or, if shelter is available, they may be moved before becoming fully dry, and hung closely together under such shelter, but where there is a free circulation of air.

Evaporating.—Many growers prefer evaporating instead of drying. The evaporators used are of various designs and sizes, but they should be large enough when the peppers are dried on strings to hold not less than 500 strings. The usual plan is to have a furnace with several turns of 8 to 10 inch pipe in the basement, the peppers being placed in the second story over a very open floor with a good ventilation. The temperature must be kept at 110 degrees Fahr., and in this way the house can be refilled about every four days.

Yield and Price.—Both of these, of course, vary with the season, soil, and water supply. Two hundred and fifty strings of 5lb. each is called a paying crop; but, with all conditions favourable, including a late, warm season, as high as four hundred strings or even 2,400lb. per acre of dried peppers may be grown. Prices range from 70 cents to 1.50 dollars per string if sun-dried, and 15 to 25 cents per lb. if evaporated.—*Queensland Agricultural Journal.*

Meteorological Returns.

Meteorological Observations taken at Government Stations for Month of February, 1907.

STATIONS.	TEMPERATURE (IN FAHR. DEGS.).				RAINFALL (IN INCHES).					
	Means for Month.		Maximum for Month.	Minimum for Month.	Total for Month.	No. of Days.	Heav'at rain- fall in 1 day.		Total for Year from July 1st, 1906.	Total for same per'd from July 1st, 1905.
	Maximum	Minimum					Fall.	Day.		
Observatory ..	84.1	69.6	90	64.1	4.06	16	1.48	11th	24.95	28.80
Stanger ..	87.6	69.3	106	64	4.39	15	1.14	24th	31.37	26.77
Verulam ..	88.9	70.2	105	61	6.83	12	1.75	10th	29.45	23.42
Greytown ..	92.4	49.6	106	38	8.31	15	1.6	4th	28.79	22.12
Newcastle ..	84.7	61.9	94	55	12.27	15	2.95	4th	44.91	5.52
Ndwedwe ..	79.9	64.0	90	57	6.02	9	1.60	28th	31.73	32.16
Metcourt ..	84.3	53.3	92	55	7.50	9	1.60	5th	24.41	22.5
Impendhle ..	..	..	..	..	9.84	19	2.34	4th	34.44	..
Mid-Illovo ..	80.3	62.7	91	57	9.45	16	3.74	4th	33.24	28.10
Camperdown ..	88.4	61.9	92	57	5.41	11	1.51	24th	31.14	..
Port Shepstone ..	84.4	64.2	89	60	5.24	8	1.3	17th	30.62	3.40
Umzinto ..	87.9	54.8	93	52	12.93	11	6.86	4th	38.22	28.91
Richmond ..	82.0	60.7	94	57	12.37	17	4.09	4th	39.11	2.77
Maritzburg ..	83.8	62.0	95	51	12.92	17	3.25	4th	39.64	20.17
Howick ..	82.5	59.3	105	54	9.07	14	1.94	4th	38.0	19.0
Dundee ..	83.5	62.6	89	56	8.9	16	1.69	18th	29.14	21.31
Weenen Gaol ..	89.5	61.9	98	57	7.27	14	2.27	21th	25.3	20.54
Charlestown ..	77.5	54.9	84	46	9.67	13	1.98	5th	45.12	..
New Hanover ..	83.5	60.5	98	58	12.73	15	4.30	18th	43.56	23.14
Vryheid ..	83.4	60.4	2	56	6.14	10	1.45	5th	3.95	..
Nongoma ..	83.4	52.4	91	40	8.98	8	1.65	4th	35.94	19.23
N'Kandhl ..	83.7	52.4	97	38	3.40	10	.86	3rd	26.33	21.32
Unlalazi ..	85.9	61.5	96	38	8.17	6	1.0	25th	..	24.49
Hiabisa ..	81.3	65.3	92	60	4.23	5	1.30	5th	36.91	23.35
Melmoth ..	82.2	63.7	94	56	4.28	15	1.50	5th	31.77	19.17
Ubombo ..	82.5	64.8	91	60	6.08	15	2.22	4th	41.69	..
Nqutu ..	81.5	60.8	94	54	7.28	12	1.61	6th	..	16.91
Ingwavuma ..	80.5	61.2	87	58	10.49	13	2.43	3rd	..	..
Amatikulu ..	88.8	67.9	101	61	3.43	10	1.40	16th	22.30	..
Point ..	..	..	..	..	3.72	13	.98	10th	30.30	27.06
Empangeni ..	..	..	..	..	8.10	6	1.40	5th	26.87	24.10
Maritzburg (Burger St.) ..	..	..	..	..	11.62	14	2.05	17th	38.95	..

Meteorological Observations taken at Private Stations for Month of February, 1907.

STATIONS.	TEMPERATURE (in Fahr. Degrees)		RAINFALL (in inches).						
	Maximum for Month.	Minimum for Month.	Total for Month.	No. of days.	Heaviest Rain- fall in one day.		Total for Year from July 1st, 1906.	Total for same period from July, 1905.	
					Fall.	Day.			
Central Experiment Farm, Hill (Mangr.) ..	92	50	7.94	12	1.5	3rd	30.68	16.86	
Experiment Farm, Weenen (Manager) ..	95	55	7.35	13	2.44	21th	19.67	13.96	
Experiment Farm (Winkel Spruit) (Mgr.) ..	88	63	9.27	14	..	2nd	33.96	29.39	
Nottingham Road (C. J. King) ..	..	..	7.60	20	1.56	12th	37.35	30.19
Adamsburst (Wm. Adams) ..	90	56	6.27	13	1.63	5th	26.68	17.71	
Hilton (W. Engel) ..	90	54	8.77	14	2.68	4th	37.78	21.86	
P.M.B., Town Bush Valley ..	..	..	10.78	15	3.29	4th	43.52	27.46
Mid-Illovo (A. N. Montgomery) ..	94	57	9.43	15	3.74	4th	32.15	23.10	
Ottawa (G. Wilkinson) ..	..	..	5.73	12	1.55	11th	30.18	..
Mount Edgecombe (Natal Estates) ..	96	65	6.3	11	.55	1th	24.76	25.72	
Corrubia ..	..	..	5.19	..	..	..	36.45	23.24
Milkwood Kraal ..	..	..	4.37	..	..	..	36.26	19.64
Blackburn ..	..	..	4.24	..	..	..	28.92	21.34
Saccharine ..	..	..	4.99	..	..	..	30.37	24.15
Eggena (W. Hawksworth) ..	97	66	11.30	16	3.89	3rd	41.98	29.8	
Umzinto, Reserve (E. W. Hawksworth) ..	..	..	10.23	12	2.63	4th	39.44	27.26
Brankhorne (Charles Scott) ..	..	..	9.20	15	1.32	6th	60.94	32.69
Riet Vlei (P. Otto, J.P.) ..	..	..	9.26	16	2.36	4th	26.20	..
Da ton (J. Potemauer) ..	..	..	6.34	15	1.30	16th	29.52	..

Coal and Labour Return.

Return of Coal raised and Labour employed at the Natal Collieries for the month of February, 1907:—

Name of Colliery.	Labour Employed.						Unproductive Work.*			Output.
	Above Ground.			Below Ground.						
	E.	N.	I.	E.	N.	I.	E.	N.	I.	Tons. Cwt.
Elandslaagte ..	18	20	250	18	190	460	12	28	33	14,412 19
Natal Navigation ..	28	76	251	18	227	137	2	4	—	13,696 4
Glencoe, Natal ..	13	109	91	11	496	7	—	—	—	12,094 8
Dundee Coal Co. ..	17	12	172	9	72	352	2	—	65	11,539 13
Durban Navigation ..	21	128	43	11	31	45	—	20	—	11,190 —
St. George's ..	16	98	134	10	159	127	1	6	—	9,277 —
South African ..	8	15	94	11	200	65	5	19	40	8,775 4
Natal Cambrian ..	13	32	123	10	200	69	1	—	—	6,310 13
Newcastle ..	7	89	22	6	212	2	2	6	—	4,237 18
Natal Steam Coal Co. ..	1	57	4	2	158	3	—	3	1	2,734 —
West Lennoxton ..	5	1	63	2	30	96	—	—	—	2,029 14
Ramsay ..	2	8	66	3	43	108	3	5	8	1,870 8
Central ..	5	39	19	5	113	8	—	5	—	1,748 4
Talana (Natal) ..	—	10	28	3	58	71	2	4	5	1,468 17
Zululand ..	1	49	—	1	42	—	4	16	—	395 —
Woodlands ..	1	5	4	1	5	3	—	—	—	45 —
Signal Hill ..	—	—	—	—	—	—	1	3	—	32 —
Nooitgedacht ..	—	2	—	1	2	—	—	—	—	5 0
Totals ..	159	697	1,358	122	2,523	1,553	35	119	152	101,154 17
Corresponding month, '06	149	655	1,066	116	2,303	1,229	39	159	145	99,949 4

* Cost charged to Capital Account.

Maritzburg,
5th March, 1907.

CHAS. J. GRAY,
Commissioner of Mines.

Return of Coal bunkered and exported from the Port of Durban for the month of February, 1907:—

	Tons.	Cwt.
Coal Bunkered ..	41,764	9
Exported to:—		
East London ..	2,974	2
Algoa Bay ..	979	16
Cape town ..	15,036	18
Swakopmund ..	58	0
Ohinde ..	388	8
Mauritius ..	505	5
Total ..	61,706	17

Custom House, Port Natal,
1st March, 1907.

(Signed) GEO. MAYSTON,
Collector of Customs.

Some interest has been aroused in the island of Madeira as the result of experiments conducted by an Italian chemist, Professor Pagisci, who declares that the juice of the fig under proper treatment can be converted into a wine of excellent taste. The professor states that its flavour is agreeable, that it is very rich in phosphate matter and almost wholly destitute of tannic acid, qualities that render it especially nourishing to invalids and children. The pulp is said also to create a new food for milk cows and fowls. The fresh fig contains only about 25 per cent. of sugar, but after it has been dried and prepared for the making of wine it yields 80 per cent. sugar.

Return of Farms at Present under Licence for Lungsickness and Scab.

STOCK INSPECTOR.	DISTRICT.	DISEASE.	OWNER.	FARM.
A. P. Crow	Ladysmith ..	Scab	Gengen ..	Rodeport
			A. MacPherson ..	Avonford
			V. Gama ..	Claypoort
R. Cooper ..	Nkandhla & Nqutu		M. Modweni ..	Dalalu
			B. Butelezi ..	"
			B. Ndhlovu ..	"
			M. Ndhlovu ..	"
			C. Sekosana ..	"
			M. Gobose ..	Lower Blood River
			S. Zungu ..	Delala
			S. O. Molife ..	Telezi
			D. Ndhlovu ..	"
			M. Setole ..	Delala
			M. Mgune ..	Blood River
		Lungsickness	L. Makoba ..	Middle Drift
			N. M. tenjeni ..	Nquebeni
S. A. Brown ..	Underberg ..	Scab	J. A. Stone ..	"
			T. de C. Arbuckle ..	Kerridge
			B. Phipson ..	Strathcampbell
			M. Fraser ..	Winterhoek
			R. C. Gold ..	Woolend
			J. B. Royston ..	Greenend
			J. van Whye ..	Silburn
			F. A. Hathorn ..	San nana
H. van Rooyen ..	Vryheid ..		Jonas ..	Witpoort
			Mjebe ..	Fresgewacht
			Machaba ..	Rooipoort
			Mgele & Co. ..	Hardscamp
A. B. Koe ..	Portion of Estcourt		H. J. Hattling ..	Servitude
A. J. Marshall ..	Dundee ..		A. W. J. Hattling ..	Koplagie
			B. J. du Bois ..	Giba
			J. W. de Brayn ..	Rooifontein
			C. M. Vermaak ..	Paddock
			L. W. Meyer ..	Langverwacht
			A. L. Jansen ..	Strathearn
			J. O. Nel ..	Kauncliffe
			A. C. Vermaak ..	Sigtuna
			T. C. Vermaak ..	Harriotsdale
			H. Vermaak ..	Paddock
		Lungsickness	Govt. Loot Stook ..	Goedekeus
E. Varty ..	Western Umvoti ..		W. J. Slatter ..	H. Im Lacy
		Scab	H. Hansmeyer ..	On Rust
J. J. Hodson ..	Ptn of Lion's River	Lungsickness	A. K. Murray ..	Shawlands
			Mrs Year ..	Brookdale
		Scab	G. H. Burgmann ..	Bosloek
R. Mayne ..	Krantzkop ..		P. W. Mare ..	Doomhoek
		Lungsickness	P. B. Nell ..	Broeder's Hoek
			Maqamganse ..	Loots Hoek
			Ugupu ..	Myoniezwe's Locat'n
			Ndabane ..	"
			S. Johnson & Co. ..	Inadie Store
			Ndabane ..	Myoniezwe's Locat'n
			Natives ..	Spitzkop
			"	Myoniezwe's Locat'n
A. H. Ball ..	Weenen ..	Scab	J. S. van Rooyen ..	Spring Grove
A. Brown ..	Polela ..		J. J. Vermaak ..	Winterhoek
L. J. Trenor ..	Harding ..		L. Molefe ..	E.P. 142, Polela
G. Daniel ..	Vryheid ..		R. Mack ..	Wetherby
			J. E. Steenkamp ..	Kloemhof
			G. Combrink ..	Goede oop
			D. Coetzee ..	Rustplaats
R. Mayne ..	Eastern Umvoti ..	Lungsickness	C. van Rooyen ..	Boschfontein
			D. A. Nel ..	Glen Belg
J. Burton ..	Portion of Estcourt		J. Bird ..	Mouliver T'n Lda.
H. C. Jarvis ..	Ixopo ..	Scab	Hulumana ..	Batman's farm

MANGE IN HORSES EXISTS AS UNDER.

Name.	District.	Name.	District.
W. E. Oates	Bergville	Nseleni	Underberg.
H. Turner	Lidgetton	A. G. Stafford	Harding
Mboyea	Bergville.	R. Thompson	New Leeds

Pound Notices.

The following cattle in the undermentioned Pounds will be sold on the 3rd April next, unless previously released :—

Finchley.—Black pig sow. Two black pigs, hogs. Two black and white hogs. The above pigs are presently on Mr. T. Deathe's farm "Sandford."

Weenen.—Black and white ewe goat, slit under each ear, described by Natives as "nseli."

Nkandhla.—One young male Kafir goat, brown colour, age about 3 months.

Estecourt.—One young red and white ox, no brands. Nineteen goats, left ear swallow-tail cut and two cuts below. Right ear, square cut out of front.

Market Reports.

(Responsibility for the accuracy of the Statements and Opinions of the following Reports rests with the respective Contributors.)

MARITZBURG.—Messrs. W. H. Walker & Co. write : Prices in every section of produce are on the decline, and there seems little prospect of them firming for some time to come. The Transvaal and the Orange River Colony bid fair to have record crops of mealies ; consequently will not trouble us for supplies ; in fact they may seek a market for their surplus grain in Natal. To send away 1,000,000 muids of mealies means the importing of sacks, which will involve an outlay of at least £25,000.

Mealies.—Prices vary between 10s. 6d. and 11s. 6d. per muid. There has been a heavy slump in mealies since the commencement of the month, and as the coast grain is coming in there is very little prospect of prices firming. Mealies at Johannesburg are about the same price as here.

Forage.—Fair demand, and prices range between 2s. and 5s. 9d. per 100lbs.

Hay.—Market abundantly supplied with good baled hay, from 10d. to 1s. 9d. per bale ; bedding, from 4d. to 7d. per bale.

Potatoes.—From 4s. 3d. to 6s. 9d. for good table varieties ; small samples from 2s. to 2s. 6d. per 100lbs. ; sweet potatoes, from 2s. 9d. to 3s. per sack.

Pumpkins.—Large quantities disposed of every morning at prices varying between 2s. and 5s. 9d. per dozen.

Kafir Corn.—Most samples offered are of inferior quality, realising from 5s. 6d. to 7s. per 100lbs.

Sunflower Seeds.—From 7s. 3d. to 7s. 6d. per 100lbs.

Tobacco.—From 5d. per lb.

Peas.—From 8s. 6d. to 12s. per 100lbs.

Onions.—From 5s. 9d. to 6s. per 100lbs.

Poultry.—Common fowls, from 1s. 6d. to 2s. 10d. each; ducks, from 3s. to 5s. 9d. per pair

Butter.—Fresh butter from 11d. to 1s. 7d. per lb.; salt butter from 9d. to 1s. per lb.

Eggs.—From 1s. 6d. to 2s. 9d. per dozen.

Fruit.—Market well supplied with apples, bananas, grapes, grenadilla, pears, peaches, plums, and pineapples.

Vegetables.—Abundance of good varieties disposed of every day, comprising beans, beetroot, bringalls, cabbages, carrots, chillies, cucumbers, eschalots, lettuce, peas, potatoer, radishes, rhubarb, and tomatoes.

Sundries.—Beef, 2d. to 6½d. per lb.; mutton, 3d. to 8d. per lb.; pork, 5½d. to 7d. per lb.; salt beef, 4d. to 5d. per lb.; bacon 3d. to 6d. per lb.; rabbits, 1s. 6d. to 1s. 9d. each; pigeons, 11d. to 1s. 1d. each; and peacocks, 7s. 6d. each.

Firewood.—Poles, from 3½d. to 6d. each; cut wood, 7½d. to 8d. per 100lbs.

DURBAN.—Mr. T. Burman, 99, Grey Street, writes:—

Mealies.—A fair number of new crop—coast mealies—are now offering, and, in consequence, the market is easier. New mealies are now being bought at 10s. per muid, and the market is likely to be easier each week.

Kafir Corn.—Supplies on hand are not large, and the market is fairly firm at 12s. 6d. per muid.

Fodder.—Large stocks still on hand; price, £5 10s. per ton, with no prospect of an immediate rise.

Natal Hay.—Is now offering freely at about £1 15s. per ton.

Potatoes.—Price still remains low.

Wheat.—Stocks fair; price, £8 5s. per ton.

Algerian Seed Oats.—Stocks are not large, and there is a fair demand at £10 10s. per ton.

Cape Seed Barley.—Very little demand, and the price remains at £10 per ton.

Rice.—The price at Calcutta is still very high, and consequently the local price remains firm.

Grain Bags.—2½lbs., are firm at 6½d. to 7d., less 5 per cent.

Imported Buckwheat.—The demand is not large, and price is £10 10s. per ton.

Onions (Cape).—Price 1½d. per lb. These onions continue to arrive in very good condition.

Flour.—Sovereign flour has advanced to £13 per ton, and price of Silverton flour is £11 2s. 6d. per ton.

Cape Bran.—Large stocks are not held, and an increase in price is likely.

JOHANNESBURG.—Messrs. Abinger, Keeling & Co., P.O. Box 564, report:—

Mealies.—Supplies to the morning market continue large, but are chiefly yellow and Ba utoland mixed. White mealies, March requirements, have been taken at very low prices for white meal and mealies, but as supplies have not come forward freely stocks here are being very heavily drawn upon, which should cause a sharp recovery from the state of panic into which the market has fallen.

Kafir Corn.—Only mixed corn has come forward, some parcels weavily, and the morning market has been over supplied.

Forage.—Good clean in demand, 4s. 3d. to 6s. 6d.

Potatoes.—6s. to 12s.

Live Stock.—Oxen, slaughter, 6-700lbs, £10 to £13; medium, £8 10s. to £10; trek, £8 to £9; sheep, Merinos, 21s. 6d. to 25s. 6d.; Capes, 21s. 6d. to 25s.; lambs, 14s. to 16s. 6d.; goats, 17s. 6d. to 24s.; pigs, 3½d. to 4½d., per lb., live; mules, large, £20 to £26; medium, £15 to £18; donkeys, £6 to £8. Market well supplied; demand good for prime oxen and sheep.

Hartman claims it to be "an undoubtable sign that a breeding horse is well bred and in good health when it is slow in development. Those which do not attain their complete growth until six or seven years are, excepting in case of accident, useful for twenty years or more, and may still be sound and healthy at thirty years. On the contrary, those which obtain their growth in four years rarely pass the age of twenty."

Agricultural Shows.

HIMEVILLE, Thursday, 16th May.—President : H. C. Gold. Hon. Secretary : Thos. E. Marriott, Brookedale, Polela.

BULWER, Wednesday, 22nd May.—All entries close 10th May. President : J. Isbister. Secretary : D. McK. Malcolm, Bulwer.

ROYAL AGRICULTURAL SOCIETY, 13th, 14th and 15th June.—All entries close 1st June. President : Sir G. M. Sutton. Secretaries : Messrs. Duff, Eadie & Co., 12, Timber Street, Maritzburg.

ESTCOURT, Wednesday, 19th June.—All entries close 8th June. President : A. F. Henderson. Secretary : E. Cautherley, Southdowns, Estcourt.

HARDING, Thursday, 20th June.—All entries close 6th June. President : A. G. Prentice, J.P. Secretary : Thos. Tribe, Harding.

DUNDEE, Thursday, 27th June.—All entries close 12th June. President : F. Turton. Secretary : J. McKenzie, Dundee.

HOWICK, Thursday, 27th June.—All entries close 12th June. President : Graham Hutchinson. Hon. Secretary : Arthur F. Dick, Howick.

NEWCASTLE, Friday, 28th June.—All entries close 18th June. President : F. A. R. Johnstone, M.L.A. Secretary : Wm. Beardall, Newcastle.

LADYSMITH, Friday, 5th July.—All entries close 30th June. President : Herman Illing. Secretary : E. Scott, Box 90, Ladysmith.

UMZINTO, Thursday, 11th July.—All entries close 9th July. President : W. Thomson. Secretary : George Lamb, Umzinto.

DURBAN, 18th, 19th and 20th July.—President : W. R. Poynton. Secretary : Frank J. Volak, New Germany.

RICHMOND, Thursday, 25th July.—All entries close 12th July. President : John Marwick. Hon. Secretary : T. McOrystal, Box 32 Richmond.

DATES NOT FIXED.

GREYTOWN (Date not fixed).—President : Major T. Menne. Secretary : W. H. Gibbs, Greytown.

MID ILLOVO (Date not fixed).—President : B. B. Evans. Secretary : C. B. Lowe, Mid Illovo.

NEW HANOVER (No Show on account of F. C. F.)—President : R. H. Oellermann. Secretary : W. D. Stewart, New Hanover.

NOODSBERG ROAD (Date not fixed).—President : Fritz. Reiche, J.P. Secretary : Paul Vietzen, P.O. Singletree.

STANGER (Date not fixed).—President : F. Addison. Secretary : H. C. Smith.

OTHER SHOWS.

PIETERMARITZBURG HORTICULTURAL SOCIETY, 17th October.—President : T. R. Sim, F.L.S. Hon. Secretary : S. Colman, Deeds Office, Maritzburg.

It is well known that many seeds are provided with wings for the purpose of securing their distribution by the wind. The mahogany affords a good example of such winged seeds. An examination of these shows that there are often provisions for securing that the seeds shall be blown as far as possible from the parent tree. It may not have been noticed that the mahogany seed, as it descends from the opened capsule, rotates rapidly. It thus forms what may be termed a vegetable aeroplane, the rotation evidently serving to retard to a considerable extent the rapidity of its descent. On examination the wing is seen to be curved like the blade of a screw propeller. The retardation is the same as that which would be experienced if a sailing ship, with auxiliary steam power, were to use her sails alone, without unshipping or feathering her screw. In a wind this vegetable gliding plane would be blown further from the tree, when a gust had dislodged it from the capsule, than if it merely had a flat wing. Another tree, *Triplaris*, to be seen in some of the West Indian Botanic Stations, has three bent wings, forming a more perfect screw propeller to keep it flying in the air as long as possible.

Executives of Farmers' Associations.

ALFRED COUNTY FARMERS' ASSOCIATION.—President: A. G. Prentice, J.P. Vice-Presidents: C. Knox, J.P., L. T. Trenor. Committee: C. M. Etheridge, E. J. Gray, W. B. Rethman, H. W. F. Rethman, C. A. Howell, R. E. H. Fann, J.P., W. T. J. Gold, Dr. Case, Revd. S. Aitchison. Hon. Treasurer: H. C. Hitchens. Secretary: T. Tribe.

BOSTON FARMERS' ASSOCIATION.—President: Thomas Fleming. Vice-President: J. Geldert. Hon. Secretary and Treasurer: W. J. Fly.

CAMPERDOWN AGRICULTURAL SOCIETY.—President: John Moon, C.O.; Vice-Presidents: A. N. Kirkman, J.P., and G. Swales; Hon. Secretary: — Wilson.

CAMPERDOWN AND DISTRICT FARMERS' ASSOCIATION.—President: John Moon. Vice-President: F. N. Meyer. Hon. Sec.: L. Baker.

DUNDEE AGRICULTURAL SOCIETY.—President: F. Turton, Esq., J.P. Vice-Presidents: The Minister of Agriculture, the Mayor of Dundee, Messrs. A. J. Jansen, H. Ryley, and W. Craighead Smith, J.P. Hon. Secretary and Treasurer: J. McKenzie. Committee: D. C. Pieters, D. Macphail, W. H. Tatham, H. Baasch, M. Taylor, J. A. Landman, N. F. Hesom, A. W. Smallie, C. W. Wysall, W. Craig, C. G. Willson, T. P. Smith, J. Campbell, J. B. Duboise, W. R. Quested, A. Grice, D. Meumann, W. J. H. Muller, J. E. Caldwell, E. C. Saville, C. M. Meyer, A. J. Oldacre.

DURBAN COUNTY FARMERS' ASSOCIATION.—Patron: J. H. Colenbrander. President: J. McIntosh. Vice-Presidents: H. Westermeyer, R. R. McDonald. Committee: F. R. W. Bohmer, G. Compton, H. Freese, W. Freese, W. Gillitt, H. W. Koenigkramer, H. W. Nichols, F. Schaefermann. Hon. Sec. and Treasurer: Frank J. Volek.

GOUBTON FARMERS' ASSOCIATION.—President: W. C. Stockil, Esq., J.P. Vice-President: M. Sandison, Esq. Hon. Secretary and Treasurer: Frederick B. Burnard, Esq.

HATTING SPRUIT FARMERS' ASSOCIATION.—President: Wm. Craig. Vice-President, J. Campbell; Committee: J. J. S. Maritz, G. De Waal, H. J. Hearn, Thos. Brookes, N. Glutz, H. Glutz, W. A. Quested, J. A. Brookes, W. J. Hislop, Thos. Dewar, J. Humphries, W. H. Tatham, A. E. Norman, D. W. H. Tandy; Hon. Secretary and Treasurer: R. J. Hearn.

HIMEVILLE AGRICULTURAL SOCIETY.—President: Henry C. Gold, Dartford, Polela. Vice-Presidents: W. Little, R. Justice, G. Malcolm. Executive Committee: G. Malcolm, W. S. Johnston, P. McKenzie, W. Little, G. Royston. Hon. Secretary and Treasurer: Thos. E. Marriott, Brookdale, Polela. Assistant Secretary: F. W. Fell, Ericksburg, Polela.

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ZULULAND COAST FARMERS' ASSOCIATION.—President: G. H. Hulett; Vice-President: C. Hill; Hon. Secretary and Treasurer: F. Brammage Ginginhlovu.

(The Editor will be obliged if the Hon. Secretaries will supply him with lists of the Executives of their Associations.)

Central Experiment Farm, Cedara.

IN order to minimise interference with the general course of work on the Central Experiment Farm, Cedara, it has been found necessary to set apart two days of the week, namely, Tuesdays and Fridays, as visitors' days.

Arrangements will accordingly be made on those days for receiving visitors and showing them round the Farm. A trap will be at Cedara Station to meet the up 9.50 a.m. train; and if intending visitors from up-country will give notice to the guard at Howick Station, on their way down, a trap will be sent to meet the train which passes through Cedara at 11.2 a.m. Visitors travelling by other trains will also be met if they will previously make arrangements by writing.

On other than visitors' days visitors may be received by appointment, but special attention cannot be guaranteed in regard to their being shown round.

At least fourteen days' clear notice must be given by associations so that there may be time to make all necessary arrangements.

W. F. CLAYTON,

Minister of Agriculture.

Diamond Drilling.

SOME of the departmental diamond drilling plants are at present disengaged and available for hire for boring for either minerals or water. Particulars as to term of hire may be obtained from the undersigned.

CHAS. J. GRAY,
Commissioner of Mines.

Model Rules for Agricultural Co-Operative Societies.

THE Department of Agriculture has for disposal, at the rate of one shilling each copies of Model Rules for the use of Agricultural Co-operative Societies. Applications should be made to the Secretary, Minister of Agriculture, Pietermaritzburg.

Employment Bureau.

THE Department of Agriculture has received applications from the undermentioned, who are prepared to become assistants or apprentices on farms. The Department will be glad to hear from farmers willing to take young men as assistants, and to place them in correspondence with the various applicants. When communicating on the subject, farmers may refer to the applicants by quoting the numbers in the following list:—

No. 90.—22 years of age, active and not afraid of work, desires situation on farm where he can acquire knowledge of farming, small remuneration with board and lodging required.

No. 91a.—Scotchman, 40 years of age, single, who has had lifelong experience of stock and agricultural farming in Scotland. Has been three years in South Africa. Produces good references. Is of respectable and intelligent appearance. Seeks managership or assistant managership of farm, if possible. Salary not of first importance.

No. 92a.—Englishman, 50 years of age, with varied experience in tea and coffee planting in Ceylon, and also of contract work. Has also been on a Sugar Estate, and has had experience in pig rearing. Salary needed.

No. 93.—Young lady, 20 years of age, trained at the Reading Agricultural College and holding certificates for Poultry and Dairying, desires situation on a farm. Is prepared to take entire charge of poultry and dairy and, if required, would accept payment on results. Stated to be keen worker and thoroughly practical.

No. 94.—Scotchman, who has lived all his life in South Africa, desires employment on farm in connection with stock if possible. Was a Head Conductor during Boer War. Was 2 years with Transvaal P.W.D. as handyman. Produces good references. Desires salary.

No. 95.—German, of respectable appearance, who speaks English fluently, desires employment on a farm. Is 48 years of age, and has been accustomed to farm work, wire fencing, masonry, carpentry, &c. Salary required.

No. 26r.—Farmer in Dundee District desires to secure services of young man anxious to acquire practical knowledge of farming. £2 per mensem offered, in addition to board and lodging.

Trees for Sale.

To encourage tree-planting, transplants and seeds of forest trees are supplied by Government, so far as in stock, at the undermentioned rates, exclusive of carriage, from the Government Nursery, Central Experimental Farm, Cedara.

Transplants of Eucalyptus, Pines, Acacias, Casuarinas, Cupressus, etc., about 25 trees in each tin, at 8s. 4d. per 100 trees. Trees in separate tins at 1s. each.

Transplants of scarce kinds, larger trees, or surplus stock, when available, will be charged at special rates, which will be furnished on application.

Tree seeds, in variety, at 1s. per packet. Price per pound, which fluctuates, will be furnished on application.

Package and postage of seed, when required, charged 1s. per lb. extra.

Orders for present or spring delivery should be addressed to the **Forester, Oedara**, and must be accompanied by a remittance in cash or postal order. Cheques cannot be accepted.

T. R. SIM,
Conservator of Forests.

Bulletins Issued by the Department of Agriculture.

Single copies may be obtained free (excepting those with price attached) on application to the Secretary, Minister of Agriculture.

No.

- 1.—"Notes on Fruit Culture," by Claude Fuller. [1902]. (*Out of print*).
- 2.—"Manures on the Natal Market, 1902," by A. Pardy. [1902].
- 3.—"Insects in an Important Rôle," by Claude Fuller. [1904]. (*Out of Print*).
- 4.—"Manures on the Natal Market, 1903," by A. Pardy. [1903].
- 5.—"Weed Circular," by Claude Fuller. [1905].
- 6.—"Manures on the Natal Market, 1904," by A. Pardy. [1904].
- 7.—"Tree-planting in Natal," by T. R. Sim. [1905]. (*Price 2s. 6d.*)
- 8.—"Agricultural Co-operation," by E. T. Mullens. [1905].
- 9.—"Potato Culture" by A. N. Pearson. [1905].
- 10.—"Manures on Natal Market, 1905," by A. Pardy. [1905].
- 11.—"Agricultural Statistics, Natal, 1904-5." [1906].
- 12.—"East Coast Fever," by S. B. Woollatt. [1906].
- 12.—"Manures on Natal Market, 1906," by A. Pardy. [1906].



NATAL HOMESTEADS.

"Ottawa."—Mr. Gilbert Wilkinson, J.P.

(See article "*A New Industry*," by "*Ergates*.")

Natal Agricultural Journal and Mining Record.

The Fibre Industry.

By J. MEDLEY WOOD.

As considerable interest is now at last being taken in this industry, it may be as well to give some account of the plants which are cultivated for the extraction of their fibre, as there seems to be some amount of ignorance on the matter.

The plants which are best suited for this purpose, and most generally cultivated, are *Fourcroya gigantea* (Vent)—the fibre from which is commonly known as “Mauritius Hemp”—and *Agave rigida* (Miller), the variety *sisalana* which yields “Sisal Hemp.” These plants are commonly known as Aloes, but they both belong to a different Order: *Fourcroya*, or more properly *Furcraea* and *Agave* to *Amaryllideae*, *Aloe* to *Liliaceae*. None of our indigenous Aloes are of any value as fibre-yielding plants. The plant which is most common in Natal is *Furcraea gigantea*. Another species, *Furcraea cubensis*, has been, and perhaps still is, cultivated in Mauritius, but it is inferior to *F. gigantea*, and is distinguished from it by its not producing a trunk, or only a very short one. This species I have not seen in Natal. Another closely related plant which is not uncommon in Natal is *Agave americana*, popularly known as “American Aloe,” or “Century plant.” This is frequently mistaken for *Furcraea*, but may at once be distinguished from it by the thickness and weight of the leaves. These leaves also contain a large percentage of strong fibre, but their great weight renders the plant quite unsuitable for cultivation commercially. Of the two first-named plants, *Agave rigida* is undoubtedly the best for cultivation, but unfortunately plants cannot be obtained in sufficient quantity in Natal at present. About 17 years ago we received from the Director of the Royal Gardens at

Kew 20 plants of this species by parcels post, all, or nearly all, of which were reared. Some time afterwards we received from the same institution a box containing a large number of plants, the whole of which were dead on arrival. The plants first received, or their progeny, are still here, but until now there has been no demand for them, and many thousands of the young plants—or bulbils, as they are called—have been consigned to the manure heap. We are now propagating them as fast as possible, and a large number have already been sent out. We also supplied to the Conservator of Forests a quantity of leaves, which were put through the mill at Umzimkulu. The fibre was forwarded to the Exhibition in London, and will no doubt be reported on in due course. Under these circumstances, the planters will for the present have to plant the *Fourcraea* until seeds can be obtained from the few plants of *A. rigida* they may be able to obtain. At maturity, when they “pole” as it is called, that is bear their flowers and seeds on a long central stalk, each plant will give some hundreds of bulbils, which should be planted in a nursery until large enough for planting out. The “Sisal Hemp” plant may also be propagated from cuttings of the roots, the taking of which does not damage the plants if carefully done. In putting out the plants in the field, whether of *Fourcraea* or Agave, the land should first be ploughed and harrowed, and the plants placed in rows—varying in other countries at from 5 to 8 feet apart, with a wider space every fourth or fifth row. It is best not to put out the plants until they are at least 18 inches high. In favourable situations and with good cultivation, cutting the leaves may commence in three to four years after planting, and an annual crop will be yielded for 10 to 15 years or more. This, however, is liable to considerable variation. The average yield per acre per annum is said to be 33 leaves from each plant, and from 50 to 90 lbs. of clean fibre to every 1,000 leaves. The average number of good leaves will depend on the distance between the plants, the nature of the soil, and the attention paid to the crop. The plant has few, if any, enemies, but wind breaks will in some cases be necessary; and severe frost, though it may not kill the plants, will certainly damage the leaves.

The great obstacle to the extended cultivation of these plants has been the want of a machine which would turn out a sufficient quantity of fibre in the day, and be worked at a moderate cost. This difficulty has now, I understand, been removed. As I have not seen the machine, however, I am not in a position to say anything about it, but I hear that it is succeeding well. The market value of the fibre is liable to much fluctuation. In April, 1906, Mexican “Sisal” was quoted at £14 per ton for inferior, and £33 6s. 8d. for good. “Mauritius Hemp,” £25 to £32 per ton. For Sisal Hemp the average for the 13 years 1879 to 1891 was £20 14s.; the highest during that period was £50, in 1889; the lowest, £19, in 1885. The present value is from £25 to £35 per ton

In conclusion, I am and have been for many years of the opinion that the cultivation of these plants will pay well, but it must be remembered that it is not likely to succeed for small holdings unless there is a central mill within a reasonable distance. The acreage under cultivation must be numbered by hundreds; small and isolated plantations cannot be recommended.

Notes and Comments.

ESTCOURT-WEENEN RAILWAY.—The new narrow-gauge railway from Estcourt to Weenen was opened at noon on the 17th April by Mr. Hitchins, the Minister of Railways and Harbours.

FIBRE MACHINERY.—In this issue will be found illustrations of types of machinery used for the extraction of fibre—*Agave* and ramie. These machines were referred to by Mr. C. Rositzky in his article on fibre in the last number of the *Journal*, but it was not possible to insert illustrations of them in the same issue.

NATAL PINES IN LONDON.—In a further communication to the Minister of Agriculture, the Agent-General remarks, regarding the consignments of pineapples sent to the Exhibition in London, that the fruit have had a very good sale up to the time of writing. "I am pleased to say," the Agent-General continues, "that my first advices as to the unsatisfactory condition of the deck pines are not applicable to Messrs. Mackinlay & Co."

PRINTING THE JOURNAL IN DUTCH.—There seemed considerable misunderstanding when this subject came before the Conference. The Minister of Agriculture made the very generous offer that if he could be assured of at least 200 extra Dutch subscribers to the *Journal*, the Government would favourably consider the printing of the same in Dutch. Many of those present reckoned the value of the 200 subscribers (at 5s. each), and jumped to the conclusion that the cost of printing the *Journal* in Dutch would only be £50. One of the delegates from a Dutch-speaking district offered to himself guarantee the £50. The actual cost, however, of entirely printing this *Journal* would be nearer £1,000 than £50. In the first case, it would take the whole time of an interpreter every month to translate the articles and revise the proofs. A qualified man could scarcely be obtained for less than £300 a year. Again, a fresh contract would have to be entered into for the printing of the *Journal*. In the present contract the value of advertisements has been taken into account, and it is doubtful whether many advertisements would be forthcoming for the Dutch issue, so that the printing would be likely to run into at least £500 a year; so that an estimate of £1,000 a year would not be far out.

A CORRECTION.—Mr. Cesar Rositzky writes asking that certain figures in his article on Fibre Cultivation, appearing in last issue, may be altered. On page 214, the price of the 16-h.p. gas suction engine should be £385, and not £420, as originally shown. The total for that section will thus stand at £670. Again, on the same page, in the next section (plant for 200 acres), the price of the 25-h.p. gas suction engine should be £500, and that of the “shed, etc.,” £378, and not £546 and £332 as printed. The total of £2,000 remains unaffected.

FIBRE CULTIVATION.—At the request of the Minister, Mr. J. Medley Wood has very kindly supplied a short article for this issue on the *Fourcroya gigantea* and *Agave rigida* fibres, based on the experience he has had of the same in Natal. There is also published in this issue a summary of an article on fibre cultivation by Mr. H. T. Edwards, the Fibre Expert of the United States Department of the Interior Bureau of Agriculture, Manila. Although Mr. Edwards’ article does not deal with *Fourcroya gigantea*, yet his observations and recommendations are equally applicable to our own fibre plants, so that the reproduction of his article should prove of especial value to Natal farmers seeking information regarding fibre cultivation.

MOISTURE IN MEALIES.—In a bulletin recently issued by the U.S. Bureau of Plant Industry, reference is made to the deterioration of maize during transit from America, or whilst in storage, and the consequent bad effect upon the European market. The principal cause of this deterioration, it is stated, is an excessive moisture content. “Corn as it is harvested in the autumn ordinarily contains from 20 per cent. to 35 per cent. of water, depending on the season and the relative time of harvesting. Much of the corn as it comes from the fields goes directly into the small elevators throughout the corn-growing States, to be transferred later to the large elevators or storage bins at the grain centres. Owing to the cold weather usually prevalent at this season of the year, corn may be stored or exported without much danger of deterioration, even though the water content is relatively high, but with a slight rise in temperature it will begin to sweat, after which fermentation soon sets in, resulting in mouldy and damaged grain.”

It has been stated that Natal mealies will be recognised on the English markets as a superior article to the American, such superiority being due to the fact that Natal mealies are sun-dried. This ensures the thorough elimination of all moisture. In their own interests, however, intending exporters must give every attention to the proper drying of their mealies before bagging. It is easy to spoil a reputation, but very difficult to re-build one; and any mealies showing signs of moisture on arrival at the port will not be allowed to be forwarded under the Government scheme of exportation.

HAILSTORM INSURANCE.—This subject was placed on the agenda of the Natal Agricultural Union, and enquiries have also recently been received from individuals regarding the feasibility of such a form of insurance. Full information on the subject was published in the *Journal* last October. The position in brief is that there are no reliable statistics available regarding the frequency of hailstorms and the damage done in Natal, and that no insurance company will undertake the business until the risks are known. Statistics are now being collected by the Department, but they will be of no value for at least five or ten years. The only practicable scheme appears to be to form a co-operative insurance association, each person paying in proportion to the value of his crops. At the end of each season payment could be made out of the funds in hand in proportion to the damage done by hail and in proportion to the funds in hand—the fund itself never being absolutely exhausted. A guarantee to pay any definite proportion of damage done would probably render the association bankrupt the first season.

THE JULIE MANGO.—The *Bulletin* of the Trinidad Botanical Department for January, 1907, contains the following concerning the "Julie" mango:—"The mango known as the 'Julie' is one of the best, or perhaps the very best, of all the introduced kinds, and is daily gaining in favour, the demand for plants at the Government Experiment Station being larger than for any other kind. Among the reasons for this preference are: (1) Its excellent flavour; (2) keeping qualities; (3) suitability for transport; (4) early bearing; and (5) its ability to produce regular annual crops. Its flavour recommends it to the majority of consumers, and as it has little or no fibre, it is eminently suitable for table use. Probably no mango known keeps good a greater length of time, and its tough skin renders it easy to pack for transit to long distances. It fruits at a very early age, often commencing at four years from planting, and sometimes earlier. The tree has a dwarf, bushy habit, and in time grows to a large size. The 'Julie' is one of the most regular croppers of all the mangos. It has been exported to England from Trinidad, and has arrived in first-class condition. Compared with it, the famous Jamaica No. 11 is 'out in the cold,' as it can be eaten with a spoon, while the No. 11 is characterised by the large amount of fibre which adheres to the seed. It is a long way superior to the 'Peters' or 'Malda,' and is always found in superior condition to that mango, which has the fatal fault of being frequently sour at the centre. Altogether, 'Julie' takes the first place among the cultivated mangos of Trinidad, and the trees suffer less from disease than most other kinds. It is certainly a fruit which can be highly recommended for cultivation for export." The Department of Agriculture is causing enquiries to be made with a view to the introduction of this variety of mango into Natal, where it should meet with much favour.

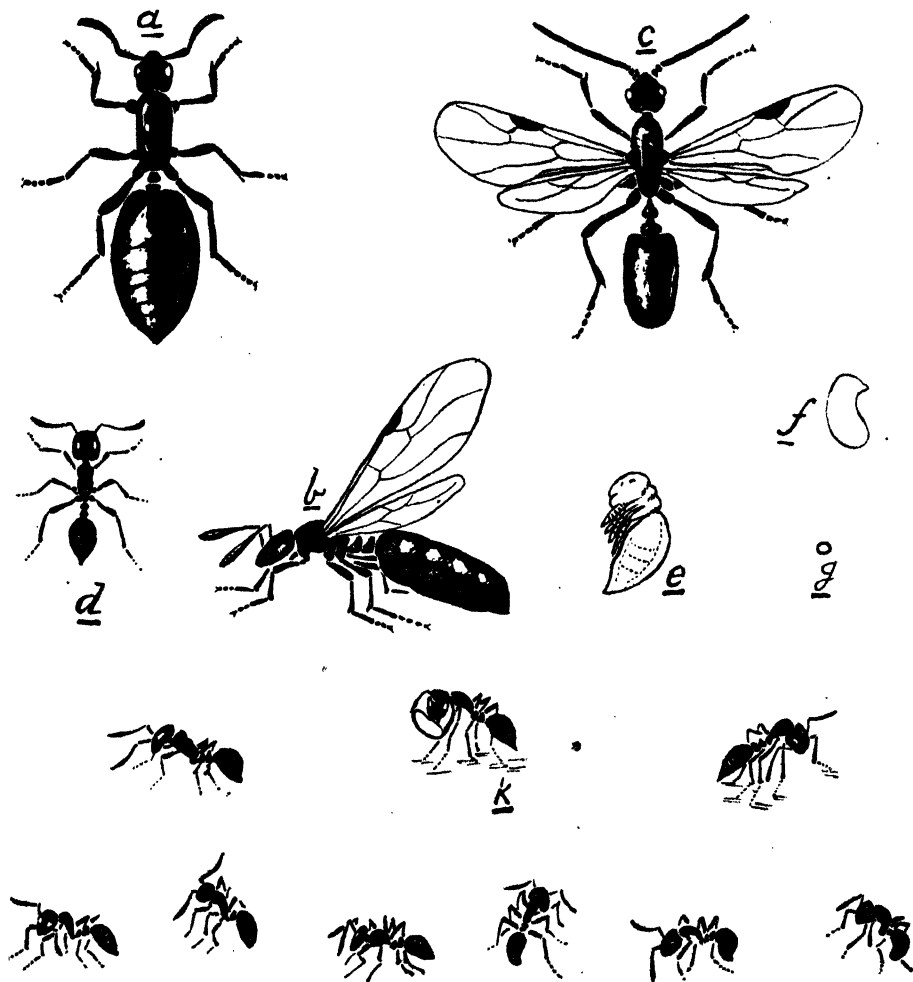
UNIFORM WEIGHTS AND MEASURES.—The Natal Agricultural Union at its last Conference removed the stumbling block in the way of the adoption of a uniform system of dealing with produce. In its previous resolutions the Natal Agricultural Union suggested the adoption of a system of selling all produce by the 100lbs. *inclusive of packages*. Were all packages of uniform weight, this would not have been an obstacle, but considering that potatoes and other produce are sold sometimes in bags or sacks and sometimes in boxes, it is obvious that a system which includes the weight of packages in the deal opens the door to a considerable amount of fraud. In boxes alone the variation in weight is considerable, and, if the produce be of a valuable nature, it is plain that the purchaser buys a wooden box at a rate far above its actual value. It is analogous to the old argument as to whether a grocer, in disposing of a pound of tea or sugar, is entitled to give you a pound weight inclusive of the paper package or whether he is not bound in all fairness to make allowance for the weight of such package, otherwise, if the tea be an expensive one, you buy the paper package at a rate of 2s. 6d. a pound—small when considering the one paper package, but large when regard is had to the total number of packages sold during a month. Legislation will be necessary in all the Colonies to bring about the wish of the Union, but, now that the objection has been removed, there seems no reason why the various Legislatures should not agree to the proposal.

LOCUST PARASITES.—A correspondent a short time ago wrote to the Minister of Agriculture, forwarding a cutting from an English newspaper relative to a certain parasite of the South American locusts, and suggesting the co-operation of the South African Governments with a view to introducing the parasite in question from Argentina to this country. The matter has been referred to Mr. Fuller (Government Entomologist), who states that the presence of these parasites in the South American locusts has been well known to entomologists since the matter was primarily investigated in 1897 by Professor Lawrence Brunner. Their presence had, moreover, been recorded prior to this. Despite the presence of these parasites, the migratory locust is as bad in Argentina as it is in relative sections of South Africa; and, this being the case, there does not appear to be any conspicuous advantage to be derived from the introduction of these parasites. Furthermore, the difficulties to be overcome in transporting the parasites in question to South Africa alive are extremely great; and also, as their host, the South American locust, is a different species from the South African, there is, judging from analogy, every probability that the parasites when here would not attack the local species, but succumb. There are already numerous parasites upon the migratory locust of South Africa at present, and amongst others an almost similar fly. Concerning this, a case came under the notice of the Government Entomologist several seasons back in which these flies destroyed more than 80 per cent. of the locust eggs laid in the district.

FIBRE BROKERS IN LONDON.—The attention of fibre planters is directed to the letter from Messrs. Mackinlay & Co., London, to the Director, Experiment Stations, appearing in our correspondence pages. Those interested will do well to place themselves in communication with subsequent shipments.”

EXPORT OF ANGORA GOATS FROM O.R.C.—The *O.R.C. Government Gazette* of the 8th April contains the promulgation of an Ordinance “to impose a duty on the export of Angora rams and ewes.” This Ordinance provides that a duty of £100 shall be imposed upon every Angora ram or ewe exported from the O.R.C., except in the case of animals exported to such other Colonies or territories of South Africa as have in force a similar statute. The position now is that all the Colonies of South Africa, together with the Portuguese Territory, have similar legislation on this subject.

INSECT-CATCHING PLANTS.—Readers of this *Journal* may possibly have heard of insect-catching plants, such as the English Sundew, a plant found in marshy places, which catches and devours insects by means of a gummy substance which holds them fast, and the Venus’ fly-trap and the pitcher plant. The one is a plant which closes up and entraps the insect which alights on it, and the other (as its name implies) is in the form of a pitcher or jug, at the bottom of which is a fluid. When the unfortunate insect visits the pitcher for a drink, it finds a most inviting path leading to the fluid, but when it essays to return, spikes projecting downwards, over which it slipped on its way to seek a drink, prevent its return. The unfortunate insect again and again climbs the pitcher wall, only to find each time its way blocked by the spikes, till ultimately, thoroughly exhausted, it can no more attempt the passage, and meets a lingering death in the watery fluid. Mr. E. F. Ford, of Maritzburg, recently brought under the attention of the Department an insect-catching plant growing at Mooi River. It is a climbing plant growing along a fence, and has small white pitcher-shaped flowers about half an inch in length. These appear to be contractile, and when insects, such as wasps, moths, and beetles visit the flowers for the sake of honey, they contract and hold the insect fast, suffocating it, so that you have the weird spectacle of a large number of white flowers growing on a hedge, out of which protruded dead bodies of all manner of insects held fast in its death grip. It does not yet appear clear whether this is an accidental circumstance due to the plant being an imported one, which in its natural clime is fertilised by a very small insect, or whether the catching of the insects serves some economy in the function of the plant, but the matter is being enquired into by the Department, and Mr. Ford is to be thanked for calling our attention to it. It may be a valuable ally where injurious insects abound, though it is evident the flowers will entrap all insects whether injurious or beneficial, so that it might prove a nuisance.



HOUSE ANTS.

- a. Female Ant, magnified 36 times.
- b. The same before shedding its wings.
- c. Male Ant, magnified 36 times.
- d. Worker Ant, magnified 49 times.
- e. Pupa Ant, magnified 25 times, without cocoon.
- f. Grub or Larva Ant, magnified 25 times.
- g. Egg of Ant, much magnified.
- h. Worker Ant carrying cocoon in its jaws; enlarged.
- Remainder, Working Ants in various attitudes.

House Ants.

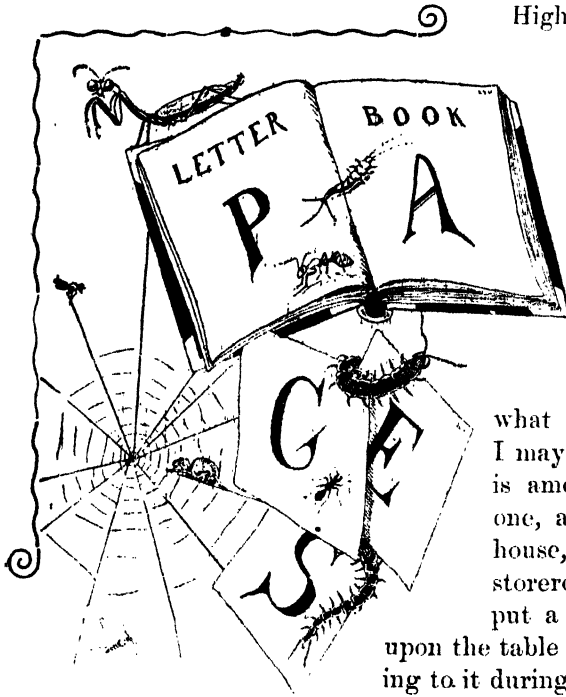
Highflats, via Ixopo,
4th March, 1907.

DEAR SIR,—

In the October number of the *Agricultural Journal* is an article about the destruction of ants. Can you tell me what was the exterminator used, where it may be obtained, and what is the *modus operandi*? I may say that the ant which is among us is the small red one, and it is all through the house, outbuildings, dairy, storerooms, etc. One cannot put a piece of bread or fruit upon the table without the ants swarming to it during the night.

Thanking you in anticipation,

Yours faithfully,
WM. GRAY.



Office of the Government Entomologist,
Pietermaritzburg, 10th March, 1907.

Dear Sir,—In reply to your letter of the 4th instant. There are a number of ants which invade the larder and other parts of the house in search of provender, but of these the small red species is the commonest and most troublesome.

LIFE HISTORY.

It is always well, in dealing with any insect pest, to have some knowledge of its life history and habits in general. The most conspicuous feature of the ants—which, by the way, are near relatives of the bees and wasps, and bear no relation whatever to the termites, or white ants—is their social instinct, which is evidenced by their living in colonies and inhabiting nests, each individual working, not for himself, but for the common weal of the community. In writing on this

interesting phase of their nature, Comstock says: "If the statesman or the philosopher would study a perfect communistic society, let him throw away his histories of poor human attempts, and go and study thoroughly the nearest ant-hill. There he will find no love for friend or wife or child, but a love for everyone. There everything is done for the good of the whole, and nothing for the individual. The state makes wars, provides food for all, cares for the children, own all the property. He will find no complaint against the existing condition of society, no rebels; but the fate of each one is determined by the accident of birth, and each takes up his work without a murmur. He will find that this perfect commune has developed courage, patriotism, loyalty, and never failing industry; but he will find also that war, pillage, slavery, and an utter disregard of the rights of other communities and individuals are as prevalent as they are among our own nations, where selfish private ambition has held sway so long."

The colonies of each species of ant include at least three kinds of individuals, as do those of the social wasps and bees, and may include several more. There are always the winged males, which die soon after the nuptial flight, and the winged females, which, after this ceremony, immediately set about the establishment of a new colony. The third form is the worker, or wingless and infertile female, and corresponds with the working class among the bees. They are sometimes erroneously called "neuters."

In some species, however, as many as eight forms have been found in the one nest. For instance, the workers are generally in two sizes; these are known as worker minors and worker majors. In addition to these there are workers who, provided with extra large heads and powerful jaws, are referred to as soldiers. Between this form and the worker, intermediate forms occur, and, lastly, we have the ergatoids (worker-like), wingless, but fertile males and females.

The red ant and most of its kind build their nests either in the walls or beneath the floorings of the house; sometimes they are built in the environs of the dwelling, and may be found at the base of some tree, beneath a convenient boulder, or even on the adjacent lawn or garden walk.

"Often in the warm summer afternoon the air will seem to be filled with countless thousands of flying ants. Their moving wings divide the sun's rays into rainbow flashes, as they rise or fall, a silent onward-moving host. This is the wedding journey of the male and female ants."

The males soon perish, but their mates, on falling to the ground and shedding their wings, have but just begun what may prove to be a long and very busy existence. From the eggs laid by the females there soon hatch the tiny little white larvae which later change to pupæ of the same hue; these are often mistaken for eggs, as they are seen carried along by their nurses, the workers. Until this first hatching has reached the adult stage, the young are fed entirely from food regurgi-

tated by the mother. Once able to look after themselves, however, they unselfishly take up the multifarious duties of feeding and nursing, and the work of building and extending the domicile. The queen, from now on, has but to lay her eggs, the subsequent care of these and later, of the larvae and pupae, being left entirely to the workers; and the responsibility is not misplaced. They carry their charges from chamber to chamber, either higher or lower, so that they may enjoy a suitable degree of warmth, and even bring them up to the open air, should the humidity and temperature required make it necessary. When next you observe these little workers, toiling along with some little white objects, do not imagine that these are ants' eggs, as commonly supposed, but understand they are the later stages of the development, and many times the size of the ova.

There is some difference of opinion as to whether the female ant is able, after the nuptial flight, by her own unaided effort, to found a new community. Some aver that, unless she is found and taken care of by worker ants, she speedily dies, as is practically the case with the bees, whilst among others the belief holds good that each of these methods is represented and followed out in the life history of different ant species.

TREATMENT.

The "Exterminator" to which you refer in your letter is known as the "Universal Ant Exterminator," and is stocked by Messrs. Henwood, Son, Soutter & Co.; it is more adapted, however, to the treatment of large nests when occurring in the open than to those actually built in the house. The machine is in two parts, the one being an air-pump, and the other a furnace, the two connected up with a short rubber hose.

A charcoal fire is first started in the furnace, and by pumping is thoroughly set alight. A little powder is then sprinkled over the fire and the lid closed. By continuing the pumping, a dense cloud of poisonous smoke is driven through the flexible hose attached to the furnace. In use, the nozzle is inserted into a gallery of an ants' nest and the smoke pumped in for two or three minutes. Of course all other entrances to the nest must be closed up with earth: these are soon revealed by the issuing smoke. After the operation, the entrance to the gallery operated on should also be filled up, and the nest left undisturbed for at least a week.

If it is not practicable to buy or use one of these machines, either carbon bisulphide or paraffin may be employed. Follow the ants back to the point of their disappearance, and if this in the wall inject either bisulphide or paraffin into the aperture.

Nests in the open may also be treated with carbon bisulphide, and it is sometimes recommended that the fumes should be exploded inside the nest. After charging, cover the hole for about two minutes, a wet sack being used for this purpose. When this time has elapsed, take a lighted stick—about six feet long—and apply to the opening. This will

ignite the then ascending fumes, and, travelling downwards, will explode and thus drive the fumes into the innermost recesses of the nest. The results are much better when done in the evening, as the workers have then all returned to the nest.

This liquid is very inflammable and is highly volatile. The fumes ignite and explode readily, and therefore naked lights should never be used when working with it.

When the ants are found to be grossly infesting a house, as in your case, recourse should be had to baits. The best of these consists in placing small bits of sponge moistened with sweetened water in the spots where the ants congregate most, collecting the sponges once a day, soaking them in boiling water, and then replacing them. I might mention here that the use of boiling water, when procurable in large quantities, is one of the best recommendations which I can make for the treatment of ants in their nests. A piece of fresh meat also acts as an excellent bait.

A syrup, made by dissolving sugar and borax in hot water, is said to be very efficacious when employed against this pest. Teaspoonfuls of the mixture should be placed on pieces of paper, and these distributed where the ants are generally observed.

I would be glad to hear what success attends your efforts to combat this little pest, and trust that the information placed at your disposal herein will help you to attain the desired end.—Yours faithfully,

ALBERT KELLY.

Notes on Co-Operation.

By E. T. MULLENS, Secretary, Minister of Agriculture.

What to Co-operate With?—Mr. G. W. Horton, of Acton Homes, in a letter which appeared in the *Natal Witness* of the 8th April, asked, with reference to my article on the subject of co-operation in the last issue of the *Journal*, "What are we to co-operate with?" Mr. Horton also stated in the same letter:—"The British labourer does (metaphorically) not care for his next door labourer as long as he has the brains God gave him to do his duty, and bring up his family on the land, and for the land."

My answer to Mr. Horton as to *what* we are to co-operate with, is "brains." We must co-operate with intelligence, with ordinary common sense and foresight; in short, with brains.

Mr. Horton's reference to the typical farmer who goes about his own business without worrying about his neighbours, shows that he, in

common with many others, has not yet grasped the significance of co-operation. Had he done so, he would have asked not *what* are we to co-operate with, but *whom* are we to co-operate with; and the answer would have been, and is, "with that very neighbour whom the typical farmer only too often considers it *form* to ignore." Co-operation is based, as Mrs. Humphry Ward declares love is, on propinquity; and will increase neighbourliness, by showing the value of having neighbours. Until farmers realise that the men with whom they have to co-operate are their next door neighbours, we shall never make any headway with co-operation.

To start co-operation in any neighbourhood it is not necessary to form a society or to raise any money in shares. A start can be made by arranging with a neighbour or neighbours to buy jointly manures or implements, so as to obtain the benefit of truck load weight on the railway and more favourable prices from the merchants on account of the larger order. Neighbours now often lend one another baling or other machines. This is co-operation; and, working on a larger scale, there is no reason why neighbours should not jointly erect drying or storing sheds; go shares in mowing machines or machines for dealing with mealies, fibre and other crops; and arrange a mutual transport service. There is no object in co-operating merely for the sake of co-operating; but it would be very difficult to find a case in which it would not benefit a farmer in some way or other to work in with his next door neighbour. The delivery of supplies to a creamery or a collecting station furnishes a good instance. There are cases to my knowledge where each neighbour sends his small supply by his own kafir or cart, resulting in the milk or cream reaching the creamery by a half a dozen or a dozen different means of conveyance, whereas one small cart would have been sufficient to have conveyed the lot. No one being willing to take the initiative, this state of things may go on indefinitely. In every neighbourhood, co-operation is merely waiting for the backward man to come forward, for someone to make up his mind to take the initiative and make a start with a few kindred spirits; and if these few words are the means of inducing but one person to make a start in his own immediate neighbourhood, they will not have been written in vain.

Mealie and Fruit Co-operation.—The election by the Natal Agricultural Union at its last meeting of committees to consider the question of co-operation in connection with the sale of mealies and fruit marks a very important stage in the co-operative movement in Natal. Mr. G. D. Alexander, who, when President of the Union a few years ago, did his best to bring about a co-operative concern on what some then considered too ambitious a scale, was again the mover in this matter, and certainly deserves the thanks of the farming community for the initiative he has

taken. Experience in other parts of the world has shown that there is every hope of success when co-operation begins with the disposal of one article of produce, such as milk, corn, etc., as then the interests of those co-operating are identical, and there are not likely to be secessions by those desirous of selling small parcels outside of the Association. It was, therefore, wise to form two distinct committees, one to consider the question of a mealie-growers' union and the other to consider the formation of a fruit-growers' union. A most healthy sign was the disposition shown by the members of the Union to work out the details of the mealie exportation themselves, and not to rely on the Government. Self-help should be the underlying spirit of all co-operation, and, therefore, whilst accepting the help of the Government so far as the railway and steamship freights were concerned and being desirous of working hand in hand with the Government, the delegates rightly decided that they ought themselves to work out all the details of the scheme, and, so far, relieve the Government of responsibility. In welcoming the formation of a central fruit-growers' union, it is not overlooked that one already exists in the Natal Orchard Association already mentioned in these columns. It is, however, very desirable that every agricultural organisation should come under the wing of the Natal Agricultural Union, and there is no reason why the promoters of the Natal Orchard Association and the committee recently appointed by the Union should not enter into correspondence with a view to bringing about the creation of a far stronger combination of fruit-growers than would be possible were each to work on separate lines.

The Natal Creamery.—Efforts are being made to amend the constitution of the Natal Creamery with a view to making it a proper co-operative concern, and rendering it eligible for financial assistance under the Agricultural Development Act of 1904. In this connection it may be mentioned that the Cape Department of Agriculture has been re-suscitating defunct creameries in that Colony, and that the concerns so assisted by that Government are now competing in Johannesburg and Pretoria with our own Natal Creamery. The terms on which the Cape Government is setting those creameries on their legs again are that a Government loan is granted in each case at 6 per cent. interest on first mortgage bond, 4 per cent. being interest and 2 per cent. sinking fund, extending over a period of $27\frac{1}{2}$ years. The farmers have to guarantee supplies of cream for a period of three years, and the Cape Government exercises rights of supervision so as to ensure good management and the supply of cream in good condition.

In reply to a letter of mine in which I advised him of the action being taken in connection with the Natal Creamery, Mr. P. J. Hannon, the Superintendent of Agricultural Co-operation of the Colony of the Cape of Good Hope, wrote that he was satisfied that this was the only

way in which success could be achieved in any part of the country, viz., the working on purely co-operative lines. Mr. Hannon at the same time stated that it might be possible to arrive at a business arrangement between the Cape and the Natal Creameries which might be of mutual advantage.

Bacon Factories.—As most Colonists are aware, a bacon factory used to exist at Richmond, which, from various causes, came to grief. The Noodsberg Road people a short time ago talked of starting a co-operative bacon factory, and now both the people of Mooi River and of Camperdown are discussing the same question. The residents of the latter district seem the most energetic in the matter, and there is every hope of success if suppliers will only guarantee a minimum number of pigs to be supplied monthly. One centrally situated co-operative concern ought to suffice for practically the whole of that portion of Natal served by the main line of railway; and it will be a pity if rival concerns are started at two such centres at Camperdown and Mooi River. It is, therefore, sincerely to be hoped, if each district is determined to go on with the concern, that meetings will take place representative of each district with a view to the selection of a site for one central factory to serve all parties. Failure of supplies is the breaker ahead of all bacon factories in Natal, and that danger will be greatly lessened if suppliers will only agree to combine and have but the one factory. A badly supported factory will be almost compelled to accept inferior animals in order to keep going; whereas one central factory ought to be in a position to refuse to accept ill-fed and inferior animals and to impose conditions similar to those which have led to the extraordinary success achieved by the Danish co-operative concerns.

General.—The enquiries received by the Department of Agriculture on the subject of co-operation are very hopeful as to the future of the movement, coming, as they do, from every district in Natal. Every information will be willingly supplied on application being made to the Secretary, Minister of Agriculture, Pietermaritzburg; and copies of rules for co-operative societies can be had for one shilling each from the Stationery Storekeeper, Colonial Office Buildings, Pietermaritzburg. It is probable that, later in the year, Mr. P. J. Hannon, the Cape Expert, may be able to address a few meetings in Natal on this subject. It may be mentioned that Mr. Hannon was one of the strenuous workers who, under Mr. Horace Plunket, did so much for Irish agriculture, and that he formed one of the first deputations which was sent from Ireland to Denmark to report upon agricultural organisation there.

A Town Farmer.

MR. ROBERT TOPHAM, J.P., PENTRICH GRANGE.

ERGATES writes:—A few weeks ago when meeting Mr. Robert Topham by chance we had a short conversation, not on frocks, frills, etc., but on the weather and crop prospects. I expressed some surprise at the interest he took in farming. "Well," he said "I am a farmer; come and see my place." This I did a few days later.

Pentrich is the name of Mr. Topham's farm or place, and is situated on the Umsindusi about a couple of miles from town. Here he has a little over 100 acres under mealies, mabele, and winter crops. He has experimented with practically every agricultural crop; thirty years ago he was growing lucerne. He was one of the earliest growers of tobacco in the Colony; the seed—Virginian—he got with great difficulty from America while the Secession war was still in progress. Seed which he got from his plants became distributed through South Africa; to any one who asked for it some was sent. Upland cotton seed he also obtained from America at the same time, and seed from his plants he similarly distributed. Mr. Topham has always taken a great interest in forestry. He has planted largely, but much of the soil of his plantations is not well adapted for trees; he wishes now that years ago he had, in a suitable district, planted thousands of acres. When in the Town Council some 30 years ago he succeeded in getting through a motion for largely planting the Town Bush Valley with Eucalypts for eventually providing railway sleepers. In the following year he went for a trip to England, and during his absence his opponents got the motion rescinded. He is firmly of opinion that the municipal rates would now have been small or even non-existent if his proposal had been carried into effect. The grounds about the house are very beautiful and contain specimens of trees innumerable, from sub-tropical paw-paws to English oaks and hawthorn. To all parts of the world he wrote for tree seeds and in turn he distributed seed from the trees he raised, and, further, he always gave with the packets some relative information from his own experience.

The house, of which an illustration is given, was built in 1866, and for a long time must have been one of the largest and best built in the Colony. The interior wood work is solid and handsome and is all from indigenous timber.

The British Vice-Consul at Adis Abeba (Abyssinia) states, in a recent report, that a new system has recently been introduced for the preparation of *Sanseveria* fibre, the machine employed turning out one metric ton of fibre in six hours. The fibre is said to fetch from £4 to £8 per ton in European markets.



NATAL HOMESTEADS.

"Pentrich Grange."—Mr. Robert Topham, J.P.

Wood and Bark.

By F. C. FERNANDO, Forester.

Wood is the principal product of forests. It is to a great extent the material on which a forest owner depends for his profit on the outlay in the formation and management of a forest. Wood being an organic structure varies considerably in quality, not only in different species of trees, but also in different trees, and even in different parts of the same tree. In view of the foregoing, it is incumbent upon the forest owner or manager—to some extent at least—to acquaint himself with the structure, and development, of the material in which he deals; and how, and to what extent, its growth and technical properties may be regulated by skilled forest management; so that it may best meet the demands made upon it in the different industries, and thereby increase its value in the market.

While a merely mechanical knowledge of wood would meet the requirements of the timber merchant, or the engineer, it would hardly that of the forester. He needs a more comprehensive knowledge of wood. He should be acquainted with it not merely from its mechanical, but also from its natural and physiological point of view. In other words, he should study wood as an organic structure through all its vicissitudes of development in the stem of a living tree. It is only then he will be in a position to comprehend how, by the judicious adjustment of the environment of a tree, it is possible, to a great extent, to control—within the limits attainable for that species—the quality of the timber produced by it.

I do not feel able to handle the subject of wood in the manner outlined by considering it apart from bark—by which term I mean all tissues exterior to the cambium—Nature has so intimately connected the two in the life economy of the stem that such a separation appears artificial and arbitrary; and would at the outset destroy the physiological significance of the subject. Happily, bark forms the staple of one very important Colonial forestal industry; and that is an added justification for its inclusion. I shall therefore treat of the structure and development of the stem as a whole, making, however, particular reference to wood. By giving the subject a sufficient latitude, I shall further endeavour to enlist the interest of the reader who may wish to become acquainted with it, not so much from a forester's as from a naturalist's standpoint.

1. The Cell.—Every animal, and every plant, consists at its earliest inception of a single cell. In the lowest plants, such as Bacteria, the life history of the plant begins and ends with the single cell. In the higher plants myriads of cells combine to build up the plant body. If we dissected any part of a multi-cellular plant into its component

elements, we should ultimately arrive at the single cell. The cell is therefore the unit of structure of all vegetable organs. In order then to obtain an intelligent grasp of the anatomy of such a complicated structure as the stem of a timber-producing tree, it is well that we should as a preliminary acquire an insight into the structure and behaviour of vegetable cells, both as units, and in combination.

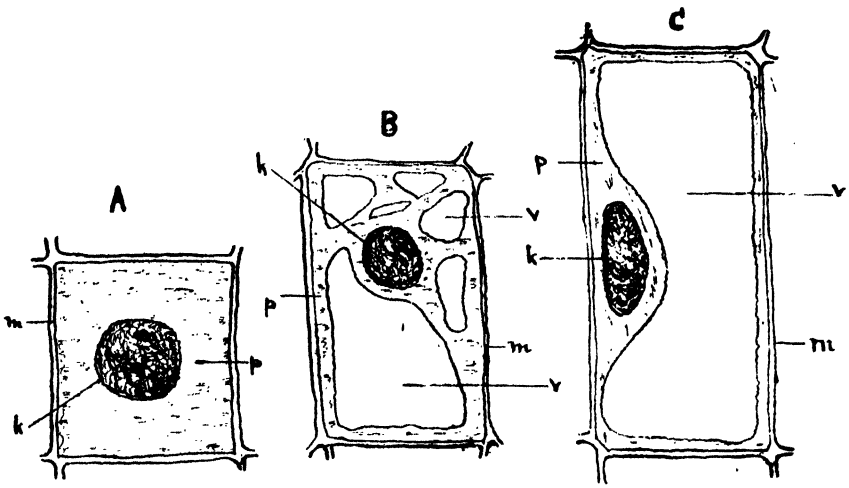
(a) The cell as a unit.—The cells composing the body of a plant are generally so very small as to be distinguishable as units only under the microscope. In a few cases, however, they are large enough to be seen by the naked eye. If the succulent leaf-stalk of a banana plant was cut through the middle, the section would reveal a large number of rectangular or cubical, almost transparent, cells aggregated into a succulent tissue. A cell (Fig. 1, A, B, and C) consists, essentially, of a specialised fragment of protoplasm (Fig. 1, p) surrounding a potential centre of greatest activity, consisting also of protoplasm, but differentiated from the general mass, and termed the nucleus (Fig. 1, k). Protoplasm, it should be said, is a proteinaceous substance of a jelly-like consistency; and is the basis of all vitality in both series of the organic world. It is the basis of life. It is not life; but is the medium through which life is manifested. So there is, and can be, dead protoplasm.

In the vegetable kingdom, the protoplasmic body, composing the essential cell, is at a very early age completely invested by a firm membrane or cell-wall (Fig. 1, m) produced from the protoplasm, but consisting of inert, or dead, matter.

After a time a cell may lose its protoplasmic contents, either partly, or altogether. In the former case the protoplasmic body is invaded by a number of cavities, termed vacuoles (Fig. 1, v) filled with watery cell-sap. Later these vacuoles may run together and form a single large cavity or vacuole, the protoplasm then lining the interior of the cell-wall as a thin layer, the nucleus, however, in both stages remaining within the cell (Fig. 1, B and C). In the latter case, the protoplasm is altogether replaced by water, containing various salts in solution; or by air. The cell is in that case dead, and only serves a mechanical purpose in the economy of the plant.

The cell is capable with growth and development of assuming a variety of shapes. Thus, it may be cubical or rectangular (Fig. 5, A, and Fig. 1, B and C), and flattened or tabular (Fig. 3, T). It may grow long and cylindrical with blunt ends (Fig. 3, B); or long and tapering at the ends (Fig. 3, C), etc., etc.

Simultaneously with the growth and development of the cell, the cell-wall may undergo a change in its character. It may become soft and mucilagenous, or suberised like cork; or hard and woody—lignified—like the cells in wood, or the stone of certain fruits. These changes are accompanied by a thickening of the cell-wall by a succession of concentric layers deposited on the inner face of the original wall.

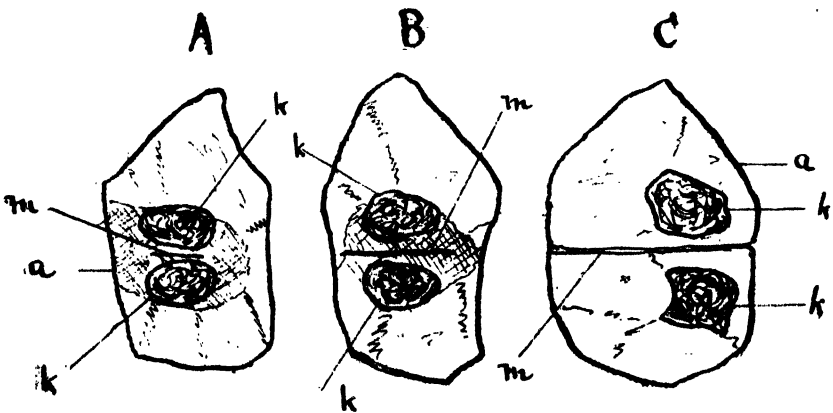


(From Strassburger's "Text-book of Botany.")

FIG. 1.—CELLS FROM THE VEGETATIVE CONE OF A PHANEROGAMIC PLANT (Diagrammatic).

A—Embryonic. B and C—Later stages. p—Protoplasm. k—Nucleus.
m—Cell walls. v—Vacuoles.

(b) Cells in combination.—Living cells are sometimes capable of multiplying by division. The process may be explained as follows:—The nucleus of each cell divides into two, and the protoplasm arranges itself around each half. A cell-wall is next formed between them, thus dividing the mother cell into two daughter cells, which, however, remain in contact (see Fig. 2).



(From Strassburger's "Text-book of Botany.")

FIG. 2.—THREE STAGES IN THE DIVISION OF A LIVING CELL.

a—Cell wall. k—Nuclei. m—Dividing membrane.

These daughter cells may be themselves capable of division; so that ultimately from a single cell an aggregate of cells is produced.

Such an aggregate of cells, of similar origin and character, exercising a common function, we call a tissue (see Fig. 3, D and E, also Fig. 5, A).

We may group tissues according to their function, and according to their structure. According to their function we designate tissues as Meristein and Permanent Tissue.

Meristein is a tissue in which the component cells are rich in protoplasmic contents; and capable of multiplying by division. "Meristein" is derived from a Greek word meaning "divisible," and expresses the essential feature of such a tissue. Meristein is a nascent tissue, and is admirably adapted for such parts of plant organs as are actively growing, but whose characters are not formed. When, by the activity of such a tissue, a sufficient mass of material has been accumulated, the cells lose their meristeinatic character. It is now an adult tissue, and the vital energies of the plant are expended in moulding its characters; in giving to this mass of accumulated material its distinctive features. Such an adult tissue whose cells are no longer capable of division is known as Permanent Tissue.

Although in the ethics of vegetable tissues, the cells of a permanent tissue are recognised as being incapable of division—and they invariably are so—it sometimes becomes necessary, in the course of the development of an organ, that certain layers of cells of such tissue should resume their activity and again become meristeinatic. Such portions of a permanent tissue as have reverted to the meristeinatic state we dis-

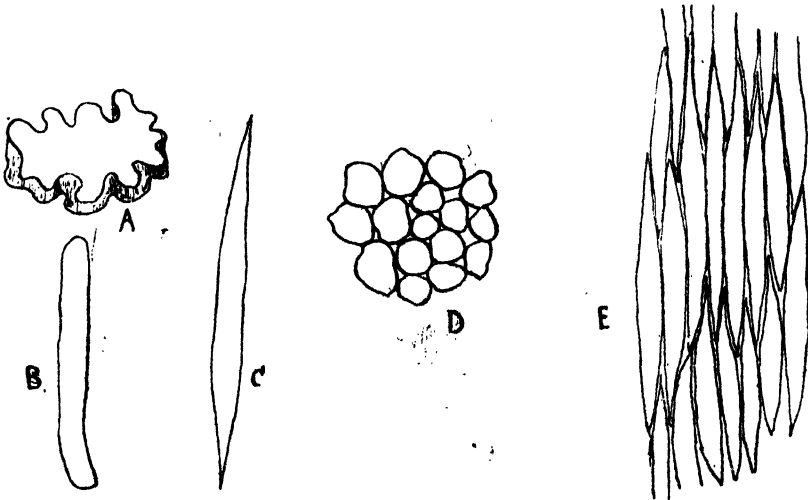


FIG. 3.

A to C—Different forms of cells. D—Parenchyma. E—Prosenchyma.
(Diagrammatic.)

tinguish as Secondary Meristem, in contradistinction to Primary Meristem, in which the cells since their inception have remained meristematic. Such a Primary Meristem always occurs in embryonic rudiments, and at the growing tips of roots and shoots.

According to the structure, we speak of tissues as Parenchyma and Prosenchyma. In their extreme forms the distinction between the two is not very sharp. Typical Parenchyma is a tissue composed of cells about as long as broad—that is, isodiametric—and rich in protoplasmic contents (Fig. 3, D, and Fig. 5, A). Typical Prosenchyma is a tissue composed of elongated cells with pointed, tapering ends, dovetailing into each other; and with little or no protoplasmic contents (Fig. 3, E).

A parenchyma in which the cells are elongated resembles prosenchyma, but may be distinguished by the absence of pointed and interlocking cell terminations, and a greater abundance of protoplasmic contents. On the other hand, prosenchyma cells rich in protoplasm can always be recognised by the pointed and interlocking terminations.

Thus far we have dealt with combinations of cells known as tissues. It will be noted that, in the formation of tissues, the productive activity was centrifugal. A mother-cell, or cells divided, resulting in several daughter-cells of equal value, with the mother-cell or cells. Each of these daughter-cells was again capable of division, repeating the process already described. A single unit acting as a centre of activity therefore resulted in several such units of equal value.

It is, however, possible for several individual cells to combine or fuse to form a single unit of a higher order. Here the order of activity is reversed. It is centripetal. This process is known as cell-fusion, the resulting structure being termed a vessel (Fig. 4, A). It is, in plain words, a long and extremely fine tube composed of several elongated cells cemented together by their ends; the dividing transverse walls or septa of the individual cells becoming wholly absorbed, when the structure is termed a true vessel or merely a "vessel," or only perforated in a sieve-like manner (Fig. 4, B), when the structure is termed a sieve tube or bast vessel.

(c) Tissue systems.—There is manifested in every organic structure a wise and beautiful design; a perfect adjustment between construction and office; an economic distribution of labour. Nature is no blunderer, she is no spendthrift. This revelation of law and order and economy in things organised is peculiarly inviting to the human mind, coinciding, as it does, with human ideals. Its realisation and contemplation belongs to the philosophy of the science, and forms one of the many fascinations that gild the study of natural history.

We may therefore view our stem as a house in order; an organisation the functions of which are assigned to several component departments, with a due regard for every physical law for mutual fitness and the policy and well-being of the whole plant.

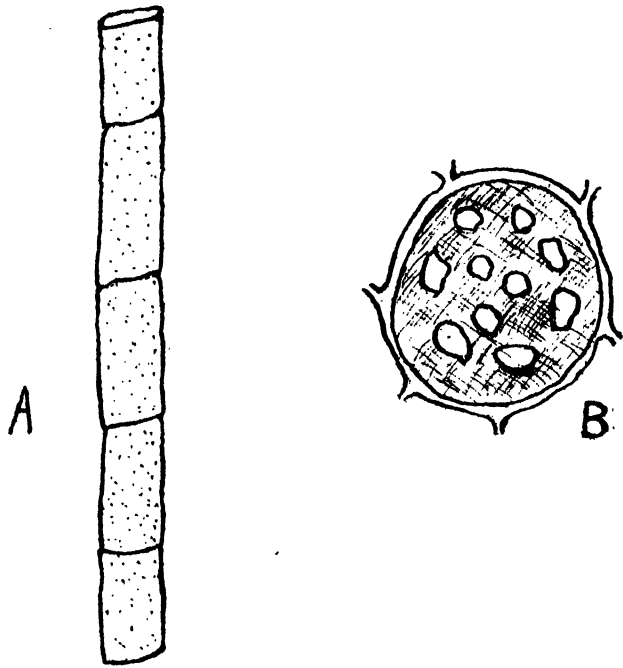


FIG. 4

A—Fragment of a vessel. *B*—Perforated septum of a bast vessel (diagrammatic).

The body of a highly-organised shoot does not therefore consist of a mass of homogeneous tissue of equal value, and performing common or unlimited functions. That is only true of it as a rudiment—material, nascent, plastic, admitting of further, and higher, development. Simultaneously with such development follows a differentiation in its structure. Masses of tissue combine to form distinct units, termed tissue systems, each best adapted to perform a function, or group of functions, peculiar to that organ. We may therefore define a Tissue System as a combination of tissues to form a distinct and specialised unit in the structure of a plant organ.

Cells then combine to form tissues. Tissues combine to form tissue systems. Tissue systems combine to form organs.

In the shoot of a highly developed plant—as, indeed, in all developed organs of such plants, whether stem, leaf, or petal, etc.—we may distinguish three tissue systems, designated as follows:—

The Fundamental System, forming the groundwork or basis of the organ, engaged in the assimilation of food and storage of the same.

The Tegumentary System, acting as a protective envelope, or covering, to the organ.

The Vascular Bundle System, affording permanent rigidity to the whole structure, and serving the purpose of conduction.

3. The Primary Tissues.

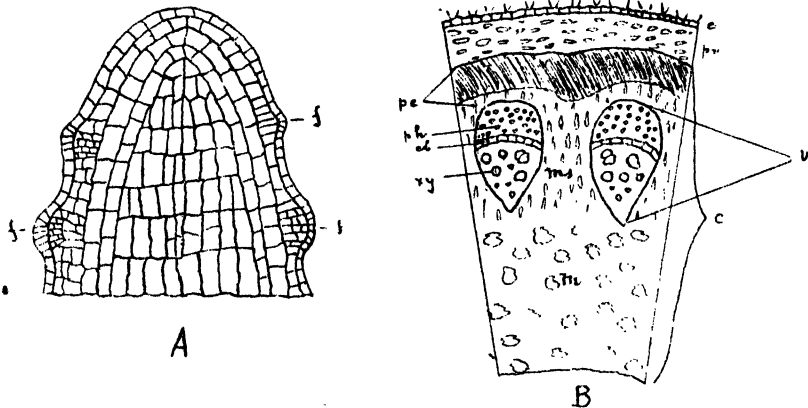
(a) Origin and definition.—We are not in a position to deal with our subject in a more concrete form.

If under the microscope we examine the extreme growing tip of some flowering bud, shrub or tree, we should find a mass of parenchymatous, cubical cells, arranged in the form of a blunt cone, somewhat like that figured in the diagram (Fig. 5, A).

This cone of actively growing and dividing cells is distinguished as the Vegetative Cone, or the Growing Point, and always occupies the extreme tip of an elongating shoot.

It should be noted that the tissue of the Vegetative Cone is meristematic. It is moreover a primary meristem. All those permanent tissues which will later be derived directly from this primary meristem are distinguished as Primary Tissues. The mass of tissue formed behind the growing point shortly—except at certain points—loses its meristematic character, becomes permanent, and, as has already been stated, differentiated into the three tissue systems comprising the older parts of the shoot.

(b) Distribution of the Primary Tissues.—The first tissue system to become differentiated as such is the Tegumentary System. The reason is obvious. The young tissues formed by the activity of the growing point, must be protected from external injury, too rapid an evaporation of the water in its cell contents, etc. The whole of the young organ accordingly becomes invested in a thin skin or Epidermis (Fig. 5, B and b, c) formed usually by a single layer of cells. The lateral



(From Strassburger's "Text-book of Botany.")

FIG. 5.

A—Vegetative cone. f—Leaf rudiments.

B—Part of a transverse section of a young Exogenous shoot. e—Epidermis. pr—Primary cortex. c—Central cylinder. pc—Pericycle, in this case with a ring of sclenchyma fibres (shaded dark). v—Fibro-vascular bundle. ph—Phloem. xy—Xylem. cb—Cambium. m—Medulla. ms—Primary medullary ray.

and outer walls of these cells become corky in character, and are thus well adapted for the function to be performed by the epidermis. On the outer surface of the epidermis there may be such outgrowths as hairs, which augment the function of the former. The epidermis is the only representative of the tegumentary system proper in shoots. With the formation of secondary tissues it becomes cast off, so that, strictly speaking, there is no representative of the tegumentary system in the older parts of the stems and branches of trees and shrubs, the office of protection being performed by the dead, and more or less corky, layers of tissue investing the stem, and popularly termed bark.

The core of tissue enclosed by the epidermis represents the Fundamental Tissue System. It is at first entirely composed of similar cells. Soon, however, a difference becomes apparent between an outer zone of small-celled and firm-textured tissue, adapted for assimilation, and an inner core of large-celled and loose-textured tissue adapted for storage. The zone of small-celled and firm-textured tissue is known as the Primary Cortex (Figs. 5, B, and 6, pr). It lies immediately within the epidermis, and its cells, being fitted for assimilation, contain the green pigment known as chlorophyll. It is these cells, seen through the colourless and transparent epidermis, that give a green tint to the surface of twigs. The cylinder of large-celled and loose-textured tissue enclosed within the primary cortex has been designated the Central Cylinder or the Stele (see Figs. 5, B, and 6).

In those plants occupying positions in the scale of vegetable organisation from the club-mosses and ferns upwards, the capacity to absorb water, containing nutrient mineral salts in solution, instead of being possessed indiscriminately by the whole surface of the plant body, is confined to certain well-defined organs, termed roots (in a strictly botanical sense). A contrivance therefore becomes necessary whereby the water absorbed by such roots—inserted generally at one end of the plant axis—may be conducted to the leaves, placed at or about the opposite extremity of such axis. In such plants therefore special conducting tracts of elongated cells, differentiated from the surrounding tissues, first become apparent, supplying the necessity that arose with the higher organisation of plants.

Such conducting tracts, or, as they are also termed, vascular strands, form the circulatory system in the higher plants. They also give permanent mechanical rigidity to organs, acting like girders in bracing up stems, and as veins, forming framework and determining the outline of such flattened structures as leaves and petals. These vascular strands (v, Figs. 5, B, and 6) represent the Vascular Tissue System. In the history of vegetable development the Vascular Tissue System, specialised as such, was of all tissue systems the last to appear. Correspondingly, in the differentiation of a young shoot, it is also the last to appear.

The disposition and behaviour of these vascular strands in Endogens, *e.g.*, palms, grasses, sedges, etc., whose stems do not increase in diameter annually; and Exogens, or those plants whose stems increase in diameter from year to year by the addition of concentric layers of wood and bast, *e.g.*, gums, pines, stinkwood, yellow-wood, etc., are not identical. Since the wood of the latter is at present the only source of Colonial timber, we shall confine ourselves to the consideration of Exogens only.

In the shoot of an Exogen these conducting traces, or vascular strands, occur as longitudinal strands, traversing the ground tissue of the central cylinder, and, arranged in a ring, immediately within its periphery (Fig. 6). Each such strand is termed a Fibro-vascular Bundle (v), and exhibits in transverse section a more or less pear-shaped outline,

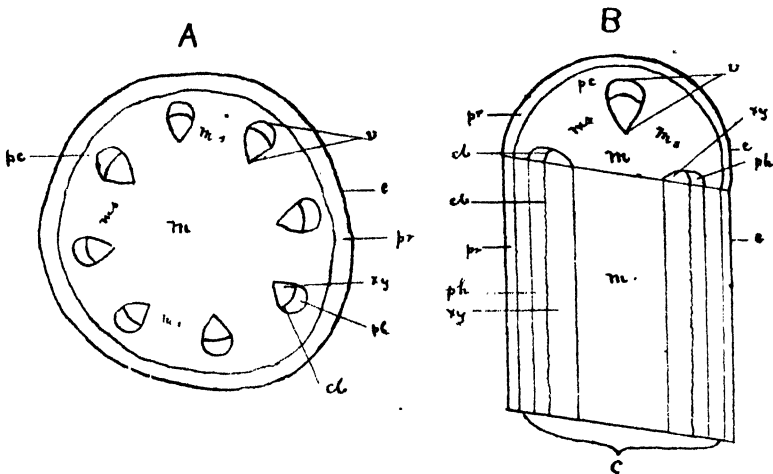


FIG. 6.—SECTIONS OF AN EXOGENOUS STEM ILLUSTRATING DISTRIBUTION OF PRIMARY TISSUES (Diagrammatic).

A—Transverse section. *B*—Longitudinal section. *e*—Epidermis. *pt*—Primary cortex. *c*—Central cylinder. *pc*—Pericycle. *v*—Fibro-vascular. *ph*—Phloem. *xy*—Xylem. *cb*—Cambium. *m*—Medulla. *ms*—Primary medullary ray.

with the pointed end directed towards the centre of the shoot (Fig. 5, *B*, *v*). At first each bundle consist of similar meristematic cells. Later the greater number of these cells lose their meristematic character, and pass into permanent tissue, becoming elongated, and specially fitted for conduction. Each bundle now consists of the following parts:—An outer Bast or Phloem portion (Figs. 5, *B*, and 6, *ph*). An inner, Xylem or wood portion (*xy*). A band of meristematic tissue between the two, termed the Fascicular Cambium (*ch*). This cambium plays a very important part in the formation of secondary tissues, and will be referred to again.

The narrow zone of the ground tissue of the central cylinder now left immediately outside the ring of Vascular Bundles is termed the

Pericycle (pc Figs. 5, B, and 6). Distributed in the moss of the pericycle are often found elongated, thickened and hardened prosenchyma cells or fibres (Fig. 5, B). Physiologically considered, they are functionless, but they greatly assist the vascular strands in maintaining the mechanical rigidity of the stem.

That portion of the ground tissue enclosed by the ring of vascular strands, and forming by far the largest proportion of a young shoot, is termed the Medulla or Pith (Figs. 5, B, and 6, m), and is well adapted for storage. Finally, the radial rays of ground tissue, connecting the pericycle with the medulla, are known as the Primary Medullary Rays (ms).

From a purely mechanical point of view, the fabric of a young exogenous shoot may be said to consist of: a peripheral shell of firm and close-textured tissues, surrounding a core of large-celled, loose-textured, and soft tissue. This peripheral disposition of the rigid-maintaining elements of the structure proves upon reflection to be the most economical. It ensures a high degree of rigidity at a minimum expenditure of material, and an appreciable reduction of weight. It corresponds with the teachings of Physics; and is precisely the arrangement a modern engineer would adopt in erecting a similar structure with the same objects in view.

Anatomically considered, the Exogenous shoot consists of the following parts:—

1. A ring of Epidermis, representing the Tegumentary Tissue System (Figs. 5, B, and 6, e).

2. The Fundamental or Ground Tissue System, comprising:—

A. A zone of Primary Cortex (Figs. 5, B, and 6, pr).

B. The Central Cylinder (c), consisting of:—

(a) The Pericycle (pc)—a zone of ground tissue lying outside the vascular strands.

(b) The Medulla or Pith (m), enclosed by the vascular strands.

(c) The Primary Medullary Rays (ms), connecting the Medulla with the Pericycle.

3. The Vascular Bundle System, consisting of a ring of vascular strands, traversing the ground tissue, each termed a Fibro-vascular Bundle, and consisting of:—

(a) An inner zone of Xylem or wood (Figs. 5, B, and 6, xy).

(b) An outer zone of Phloem or Bast (ph).

(c) An intermediate zone of meristem termed the Fascicular Cambium (cb).

The reader should not depend on the diagrams alone for an illustration of the distribution of the various tissue systems in the young shoot. He should locate them for himself in living specimens. For

this purpose he should select young shoots of such soft and herbaceous plants as the balsam or gourd, or the rapidly-grown spring shoots of such a tree as the real yellow-wood. The kind selected is, however, immaterial, but it is necessary that the shoot be succulent and rapidly developed, because in such shoots the parts to be examined are not quite so minute as in shoots more slowly developed. Next with a sharp pocket-knife a few thin, transparent slices, both transverse—some near the growing tip, and others lower down—and longitudinal, are made. He should then place these on a slip of glass, or hold them up to the light, and examine them with the strongest magnifying glass at his disposal.

We are now acquainted with the anatomy and distribution of the Primary Tissues in an Exogenous stem: and here the present instalment of this paper must end.

Wood and bark, as they are generally understood, both in Conifers, *e.g.*, pines, cypresses, *araucarias*, and yellow-wood: and in Dicotyledons, also known in forestal parlance as "broad-leaved species," *e.g.*, gums, oak, sneezewood, stinkwood, etc., are a product of secondary tissues, and will be dealt with in the succeeding number of this *Journal*. It should, however, be borne in mind that such Secondary Tissues are repressions of the continued activity of Primary Tissues. Therefore in the stems of all plants exhibiting secondary growth the Primary Tissues are the first to appear—as the dissection of a young and rapidly-grown shoot will reveal—and comprises incipient wood or bark. In beginning with a description of the Primary Tissues, I have therefore been consistent with Nature, and thereby placed the reader in a correct relation to the subject: and afforded him, I hope, a coign of vantage from which he may follow the subject in an intelligent manner.

(To be continued.)

Inter-Colonial Veterinary Conference.

MEETING AT BLOEMFONTEIN.

ON the 5th, 6th and 7th of March, representatives of Cape Colony, Natal, Transvaal, Orange River Colony, Rhodesia, Basutoland, Bechuanaland Protectorate, Lourenco Marques, and German South-West Africa met at Bloemfontein to discuss the framing of uniform regulations for inter-colonial movements of stock.

Owing to the prevalence of East Coast Fever in the Transvaal and Natal, and Lung sickness in the Cape Colony, it was not thought advisable or possible to frame any practical regulations for inter-colonial movements of horned cattle.

In all eighteen resolutions were adopted by the Conference. As a whole, they are, in the opinion of Mr. S. B. Woollatt, Principal Veterin-

ary Surgeon, of a practical nature, and the outcome of what is known to be necessary to safeguard the interests of the various Colonies against the introduction of disease over their borders, and to place upon individuals the least inconvenience consistent with efficiency.

Of the resolutions passed by the Inter-Colonial Conference, seven deal with and prescribe precautionary measures for stock in transit, three deal with dipping, two with glanders, one with rabies, and one with lung-sickness; and the remaining five deal with ports of entry, disinfection of trucks used for the conveyance of live stock, and general matters.

EAST COAST FEVER AND THE MOVEMENT OF SHEEP AND GOATS.

On the motion of Mr. Grist (O.R.C.), it was resolved:—

“That all restrictions hitherto placed on the movement of sheep and goats for the purpose of preventing the spread of East Coast Fever be withdrawn. (*Resolution No. 1.*)

PORTS OF ENTRY.

Mr. Gray (Transvaal), seconded by Mr. Woollatt (Natal), moved:—

“That mutual ports of entry for the introduction of small stock should be established, and that the cost of establishment and maintenance of such mutual ports should be divided between the Colonies using such ports. (*Resolution No. 2.*)

This resolution makes provision for sheep entering a Colony for winter or summer grazing.

SHEEP AND GOATS IN TRANSIT.

Resolutions 4, 5, 6, 7, 8, 9 and 12 deal with precautionary measures in the transit of sheep and goats. Resolution 4 Mr. Woollatt considers a very necessary one, governing, as it does, the entry of sheep by rail. It is understood that it is not practicable to detain sheep at a port of entry for the purpose of dipping; particularly as at some ports of entry the dip is not adjacent to the railway. The following is the resolution in question:—

“That all sheep or goats exported from one Colony to another by rail should be certified to be clean by an Inspector of Stock in the Colony from which they are exported, should be dipped once under the supervision of such Inspector, and should pass the port of entry within ten days of each dipping. At the port of entry the sheep or goats should be examined by the Inspecting Officer, who should allow them to proceed to their destination if he finds them dipped, free from scab, and their certificates in order; and, on reaching the detraining station or on arrival at destination as the receiving Colony concerned may prescribe, these sheep or goats should again be dipped under supervision within a period of not more than 16 days from the date of the first dipping.

“This resolution is not intended to affect any Colony through which sheep or goats may pass by rail in transit from one Colony to another.”

Resolution No. 5:—"That sheep or goats intended for immediate slaughter purposes should be admitted by rail under the same conditions as others, except that they be exempted from being dipped on arrival at their destination, provided they are accompanied by a declaration that they are intended for slaughter within ten days of being admitted, and provided that they are plainly branded on the back with a distinctive brand to be hereafter decided upon."

Resolution No. 6 recommends:—"That sheep or goats certified by the owner to be intended for exhibition purposes and accompanied by a certificate of health from a Government Veterinary Surgeon or Stock Inspector should be allowed to pass from one Colony to another by rail without dipping, provided they are declared as visibly clean by the Inspector at the port of entry, and provided a copy of the certificate is previously posted to the Agricultural Department of the receiving Colony."

This resolution is intended to meet the requirements of persons sending sheep for exhibition.

Resolution No. 7 advocates:—"That well bred sheep or goats intended for stud purposes (the onus of proof of which intention shall rest with the consignor) should be allowed to enter another Colony by rail without being previously dipped in the exporting Colony, provided they are accompanied by a certificate from a Government Veterinary Surgeon or Stock Inspector that all the sheep on the farm from which the said stock have been taken have been free from scab for 12 months or longer."

Resolution No. 8 does not really affect Natal, as it applies to sheep in transit from other Colonies.

Resolution No. 8:—"That thoroughbred sheep or goats from overseas, if passed as clean by a Veterinary Surgeon or Stock Inspector at the port of landing, should be allowed to proceed to another Colony without being dipped, provided that, if any delay occurs in transit, the owner be furnished with a certificate from the Government Veterinary Surgeon or Stock Inspector that such sheep since landing have remained clean and have not, to the best of his knowledge, come in contact with any diseased sheep on the premises."

Resolution No. 9 has been formed to make practical provision for dealing with sheep or goats which may be found to be diseased upon arrival at a port of entry. It is not intended to lay down a hard and fast rule that a diseased animal must be sent back to the exporting Colony; but it is considered only fair to give the importing Colony the right to return diseased animals.

Resolution No. 9:—"That exporting Colonies should bind themselves to receive back into their territory from the port of entry infected sheep or goats found travelling by road or rail therefrom without imposing any restrictions upon their re-introduction if such a course be con-

considered desirable by the authorities of the Colony to which the sheep are consigned."

Resolution No. 12 recommends:—"That all cattle imported into South African Colonies from oversea, except cattle branded as intended for immediate slaughter coming from countries in which tuberculosis is not prevalent, should be detained and tested with tuberculin by a Government Veterinary Surgeon at the port of debarkation, whether accompanied by a tuberculin certificate or not, and should not be liberated unless they pass the test in a satisfactory manner. The cost of testing such animals at the port of debarkation should be borne by the importer."

To meet the requirements of this resolution, our Tuberculosis Act would require a slight amendment. Objection to this might be raised on the part of the importers, but it is in their interests to have healthy animals, and the risk of diseased animals reacting here could be overcome by insurance.

All countries have experienced difficulty in accepting tuberculin certificates unless they are prepared to accept some risk of diseased animals entering the country. In consequence, some countries, as Canada, for instance, insist that all animals are tested by their own officer at the port of landing; and Mr. Woollatt is of opinion that, if we intend to prevent animals in the early stages of tuberculosis being brought into this Colony, Natal must do the same.

SHEEP DIPPING.

Three of the resolutions deal with the dipping of sheep, Nos. 3, 10, and 11.

Resolution No. 3, proposed by Mr. Woollatt (Natal), and seconded by Mr. Gray (Transvaal), recommends:—

"That all sheep and goats travelling by road from one Colony to another, except those entering another Colony under special regulations for the purpose of winter or summer grazing, should be dipped at the port of entry and allowed to enter after being examined and passed as visibly free from disease by a competent officer on the condition that a second dipping be carried out within a period to be prescribed by the receiving Colony."

Resolution No. 10 advocates:—"That for the dipping of sheep or goats at the various ports of entry a preparation of lime and sulphur be used. Such preparation to be approved by the Governments of the various Colonies."

There is no doubt, Mr. Woollatt thinks, that one of the chief causes which prevents scab being satisfactorily dealt with, is the need for the compulsory adoption of a uniform dip. The lime and sulphur solution is undoubtedly the most efficacious and safest to use, particularly as regards travelling sheep.

Resolution No. 11:—"That this Conference is of opinion that the

Governments of the various Colonies should combine in order that experiments may be conducted with a view to recommending one dip which shall be considered as an efficacious scab-destroying preparation and which shall embody preventative as well as curative properties."

LUNGSICKNESS.

Mr. Gray (Transvaal) proposed, seconded by Mr. Henning (Basutoland), and it was carried unanimously:—

"That, with a view to preventing the spread of Lungsickness from one Colony to another and in order to obviate the necessity for imposing harassing restrictions generally affecting all movements from Colonies in which the disease is prevalent, it is desirable that steps should be taken to prevent any movement of horned cattle from those districts or parts of a district in which the disease prevails and with respect to native territories in which the disease has broken out, the extent of the areas quarantined should be sufficiently large to ensure the segregation of all animals which may have been exposed to infection. Information of the precise extent of all quarantined areas should be supplied to all neighbouring Colonies." (*Resolution No. 13.*)

GLANDERS.

With regard to Glanders, two resolutions were passed—Nos. 14 and 15.

Resolution No. 14 recommends:—"That steps should be taken by all South African Colonies to ensure the early eradication of Glanders in order that the existing restrictions placed upon movements of equines from one Colony to another may be removed with as little delay as possible, and suggests that the institution of a system of compensation for reacting, but visibly healthy animals condemned and destroyed by order of the veterinary authorities is the most satisfactory and most economical method to adopt in order to stamp out this disease."

It was further resolved (No. 15):—

"That until Glanders is eradicated or brought well under control, it is desirable that equines removed from one Colony to another, with the exception of those classes mentioned in the appended list, should be accompanied by a certificate signed by a qualified Veterinary Surgeon approved by the Veterinary Department and worded as set forth in Schedule "A" attached. Should this certificate not be forthcoming, such imported equines should be detained at the port of entry until they have been tested with mallein, or until the owner has arranged with the Veterinary Department of the receiving Colony for the inspection and testing of such equines.

"The classes of equines which shall be exempt from this regulation should include—

"1. Race horses in training.

"2 South American equines in transit passing direct from the

ship to the railway, entering under special permit from the Veterinary Department of the receiving Colony.

"3. Equines brought in for exhibition purposes.

"4. Military and Police horses certified to be coming from units in which Glanders does not exist.

"5 Equines engaged in *bona fide* transport movements across the border travelling under special permit." (*Resolution No. 15.*)

RABIES.

One resolution—No. 17—was passed in connection with rabies:—

"This Conference views with alarm the spread and prevalence of rabies in Southern Rhodesia, and urges the adoption of the most drastic measures in order to prevent the extension of the disease to the Transvaal, Bechuanaland Protectorate, and Portuguese East Africa. For this purpose it is desirable that these Colonies should continue to enforce and, if necessary, impose further restrictions for the effective control of dogs within their territories in order that the introduction of inter-Colonial regulations affecting the movement of dogs therefrom to other Colonies may not be necessary."

DISINFECTION OF RAILWAY TRUCKS.

Resolution No. 18 deals with the disinfection of trucks used for the conveyance of live stock. It was resolved:—

"That every railway truck, or dog box, which shall have been used for the carrying of live stock or skins should be thoroughly disinfected by a responsible railway officer immediately after removal of such live stock or skins. Such disinfection to be carried out in the following manner:—

"1. The interior of such truck or dog box and the litter to be washed by means of a powerful spray with some preparation to be decided upon by the Governments of the several Colonies concerned.

"2. All refuse matter should then be removed and at once burnt and the interior of the truck or dog box well white-washed. The same precautions should be observed for the disinfection of all places at which stock are entrained or detained."

REMOVAL OF IMPORT RESTRICTIONS.

Upon the motion of Mr. Von Jordan (G.E. Africa), and seconded by Mr. Woollatt (Natal), it was resolved:—

Resolution No. 16.—"That when any Colony officially notifies the neighbouring Colonies that it is free from any particular disease for the prevention of which restrictions have been previously imposed, such neighbouring Colonies should at once take all reasonable steps to assure themselves of such freedom from this disease with a view to withdrawing such restrictions."

A New Industry.

INTERVIEW WITH MR. GILBERT WILKINSON.

By **ERGATES.**

IN the "Short Notes" of the September issue of last year, attention was drawn to the possibility of a methylated spirits industry. Since then I have made some investigation into the subject, and have arrived at the conclusion that:—Firstly, there is an opening for the makers of methylated spirits to do a business running every year into a great many thousands of pounds; and, secondly, that by the use of methylated spirits there would be a very considerable saving in expenditure for every colonist who used paraffin for lamps or for oil-engines. The sugar-makers would make their gains direct, and if "saving money is making money" then all who use paraffin, petrol, gasoline, etc.—practically every colonist—would "make money" by the industry. There are other points: the money that goes out of the Colony for paraffin, etc., would be retained in the Colony, and there can be no doubt that a large demand for the spirits would come from our over-berg neighbours. This would bring the Colony money from outside, to say nothing of providing some cargo for the strings of empty railway wagons constantly being hauled up-country.

For the greater part of the information I have obtained on the subject I am indebted to Mr. Gilbert Wilkinson, of the Ottawa Sugar Estate. With his father, the late Mr. Anthony Wilkinson, I had an extremely interesting "interview" some six years ago; page 457, Vol. IV. Mr. Gilbert Wilkinson, as most know, is the discoverer of the system of locust poisoning now practised in all parts of the world, and, in recognition of which discovery, he was the recipient of a Vote of Thanks from Parliament—also a handsome silver salver. Mr. Wilkinson, like his father, as shown in the interview referred to, takes broad views of subjects of Colonial interest, and it would be wholly erroneous to attribute his views on the alcohol industry solely to his self-interest as a distiller. The subject he understands in all its bearings, and with that knowledge he can put forward arguments in a manner to win conviction.

DE-NATURED ALCOHOL.

IN what follows the use of the word alcohol will be more convenient than the popular "spirit" or "spirits," and similarly, the use of the word de-naturing instead of "methylating." The last word is derived from methyl, a wood product originally used for making ordinary alcohol so unpalatable that it could be used only for industrial purposes. Since then other chemicals still more efficacious for the purpose have been found, and in consequence that word methylated is generally giving way

to de-natured, a comprehensive and self-explanatory word. Alcohol can be extracted from all vegetable and many other substances. The chief sources are sugar-cane, grapes, beetroot, mealies, and potatoes. Rum comes, or should come, from sugar-cane juice, but the cheap sugar alcohol of commerce is a by-product obtained from the refuse of a sugar factory. No other alcohol can compete with it in Natal as regards cheapness. In the present very limited business in Colonial de-natured alcohol, the price is only 1s. per gallon, say 2d. for a bottle full. To the public this alcohol is variably retailed at 6d., 9d., and 1s. per bottle. These disproportionate profits would, of course, disappear were the use of industrial alcohol to become general.

WHAT GERMANY HAS DONE.

British nature is conservative and everything novel is commonly looked upon with distrust. Examples or precedents are therefore desirable for awakening interest, and happily in this matter of de-natured alcohol there are examples from two of the greatest and most economically advanced nations of the world. Germany led the way. Germany has no mineral oils, and in that respect resembles Natal and South Africa generally. Germans can indeed buy their oils more cheaply than we in South Africa can. Under such conditions it is impossible for any one to say that the example is not a fair one. Germany foresaw that alcohol even when made from potatoes and the refuse of beets could take a superior place to paraffin, petrol, gasoline, etc., and the extent of the industry to-day affords to the world testimony to the wisdom of that foresight. Apart from motor carriages, Germany has about 5,000 small farm and similar engines run by alcohol. As an illuminant it is estimated that alcohol in a proper lamp gives about twice as much light with a consumption of only half that of paraffin. In this connection it should also be borne in mind that the price mentioned for alcohol—1s. per gallon—means the price per imperial gallon, and not the short American gallon of paraffin. A recent exhibition in Germany demonstrated the uses to which de-natured alcohol may be put. There were exhibits of alcohol engines of different makes, alcohol boat-motors designed for the Russian Navy, and motors for threshing, grinding, wood-cutting and other agricultural purposes. There was also a large and varied display of lamps, chandeliers, and street lamps, in which alcohol vapour is burned like gas in a hooded flame covered by a Welsbach mantle. Readers who know England may have noticed this class of lamps in the London A. B. C. refreshment-rooms and elsewhere. Alcohol heating stoves of ornamental appearance for warming halls and rooms were exhibited in large variety. Also were displayed in endless variety cooking stoves of all sizes, forms and capacities from complete ranges to the simple urn-lamps, or self-heating laundry irons. Mineral oils throw off disagreeable fumes, and are specially dangerous as inflammables. De-natured alcohol throws off no disagreeable fumes, and, in the event of accidental fire, it

can be extinguished with water, whereas water spreads the flames of mineral and various other oils.

WHAT AMERICA IS DOING.

So much for Germany. As to the prospects of alcohol in America, I quote a few lines from the work "Distillation of Alcohol and De-naturing," by F. B. Wright, Spon & Chamberlain, New York, U.S.A.:—"While England and France are behind Germany in fostering this industry, yet they are far ahead of the United States in this matter. De-natured alcohol could be readily gotten in these countries for industrial purposes, while the United States continued to charge a high internal revenue tax on all but wood-alcohol. This prevented the use of alcohol in competition with gasoline or kerosene and limited its use in arts and manufactures. On June 7th, however, Congress passed the "De-naturing Act," as it is called, which provided in brief that alcohol, which had been mixed with a certain proportion of de-naturing materials sufficient to prevent its use as a beverage, should not be taxed. The passage of this Act was alcohol's new day, and is destined to have a wide influence upon the agricultural pursuits of the country. In the matter of small engines and motors alone one estimate places the farm use of these at three hundred thousand, with an annual increase of one hundred thousand. This means an economical displacing of horse and muscular work almost beyond comprehension. If now the farmer can make from surplus or cheaply grown crops the very alcohol which is to furnish the cheaper fuel for his motors, he is placed in a still more independent and commanding position in the industrial race. . . . The wisdom of the German system, established by the law of 1887, has long ceased to be a question of debate. For every reichsmark of revenue sacrificed by exempting de-natured spirits from taxation the empire and its people have profited tenfold by the stimulus which has thereby been given to agriculture and the industrial arts."

DE-NATURING.

Now for a few words as to the de-naturing. That de-naturing can be effectively done may be taken as granted or the sale of de-natured alcohol would not be permitted for all Governments depend for income largely on the taxes imposed upon alcohol for drinking purposes. In that direction there exists practically no danger. With only methyl added it is true there have been individual cases of drinking the horrible mixture, but such rare cases can be safely ignored. Drink-maniacs have been known in some instances to imbibe naphtha, turpentine, and other abominable liquids. Pyradin is another chemical for de-naturing, and this imparts to alcohol an inconceivably disgusting flavour. Owing to a happy chance I had the opportunity of smelling this stuff, for during my visit the Excise Officer arrived on duty. The most cautious inhalation not only gave a feeling of nausea but caught the throat with a constrictive sensation. This de-naturant has recently been adopted by the

Natal authorities. With alcohol de-natured according to the chemical knowledge of the day there can be no danger among any people of its being used as or converted into a beverage. Such, at any rate, is the opinion in Europe and the United States.

HOW TO CREATE THE INDUSTRY.

To make the industry flourish in Natal as it should, it appears to me that there are two things requisite: business enterprise and abolition of the restrictions on the sale of the de-natured spirit. The business enterprise would lie in the bringing under the notice of the public the advantages of industrial alcohol as a cheaper and otherwise preferable substitute for paraffin, petrol, etc. Agents for the sale of the liquid, lamps, etc., from whom all information could be obtained should be established in the bigger towns. These agents should show motors at work and lamps burning. Demonstrations should also be given at the principal agricultural shows of this and the neighbouring Colonies. This business would have to be promoted and perhaps backed by the owners of sugar estates. As to the question of restrictions on the sale of de-natured spirits, this is what Mr. Wilkinson said:—"The restrictions hamper and almost kill the trade; if I get an order for de-natured spirits, say from a chemist, I must find out whether he has a license for selling the stuff. I am of opinion that the retailer should not be called upon to obtain a license and that the distiller should not be required to ascertain whether he, the customer, is in proper possession of such a license. Then, again, if you were to buy even a gallon or two of the stuff from a license-holder you might at any time be called on to explain to the satisfaction of the authorities how you were using the stuff. The de-naturing is done by an official, and as soon as the stuff is passed by the official as de-natured, that is to say, as a stuff unsaleable in any way for drinking, but of the very highest quality for industrial and illuminating purposes, then the selling of it should be no more impeded than if it were tea, mealies, milk, or coal. Of de-natured spirits less than ninety thousand gallons was produced last year; the sugar output per year, which is on the increase, is about 30,000 tons, and from the residue of molasses of every ton manufactured thirty gallons of 60 over proof spirit can be obtained. If this residue of molasses were distilled Natal would produce a million gallons yearly—which at 1s. per gallon would mean £50,000 per annum."

Such were the views of Mr. Wilkinson, and among my acquaintances interested in the sugar industry to whom I have broached the subject they receive full confirmation. With the other side of the question, the superiority of alcohol compared with paraffin for heating and illumination, I have already dealt. The industry is natural to the conditions of the Colony. It requires no petting and nursing; give it the fairplay it receives elsewhere and apparently the success it deserves will inevitably attend it.

VALE.

This is my last contribution to the *Journal*. All who have helped me with my work, now in its tenth year, and especially those whom I have "interviewed," I ask to accept my warmest thanks. Those whom I have interviewed, in receiving me as a fellow-farmer, never, in any instance, withheld information which I said might be of use to others engaged in farming. Their kindly hospitality and their readiness to help me I shall always remember.

The Cultivation of the Orange.

By HENRY S. DWYER.

THE Orange, *Citrus aurantium*, as the name denotes, belongs to the Citrus family, and is, together with several other species, extensively cultivated on account of the commercial value of its fruit. It is supposed to be indigenous to South-Eastern Asia, but has now spread to, and is cultivated in, all the warmer parts of the world.

The fruit of the Orange was originally a small bitter berry, consisting for the most part of skin and seeds, and has been brought to its present state of perfection chiefly by means of carefully and judiciously selecting seed from the best fruits. Improvements have also been effected by cross-pollination with other species of the Citrus family, as, for instance, the Citron and the Lime; and in the case of Blood Oranges the crimson splashes and tints in the flesh are supposed to be due to a remote crossing with the red Shaddock. We also find that when trees are transported from one country to another the altered climatic conditions, and change of soil, sometimes exert an influence on the fruit and times of ripening. It is also claimed that double-working (budding) has improved the flavour of the orange; and it doubtless tends towards the elimination of thorn, and, probably, seed. Of late years, the Experiment Stations in various parts of the world, improved methods of cultivation, and chemical fertilisers, have all played an important part in the improvement of, not only citrus, but every class of fruit.

PROPAGATION.

The orange is propagated chiefly from seed, which is best sown in tins (paraffin tins cut into two) or shallow boxes; as if sown in seed-beds they are apt to throw out a long tap-root at the expense of the side roots, which is by no means desirable. Hessian screens should be erected over the seed-tins to protect the young plants from the fierce rays of the sun, and in dry weather they should be frequently watered, otherwise they are liable to receive a check. The following spring they

should be planted out in nursery rows three feet apart, and trees about twelve inches in the rows, which will give plenty of room to work when budding. In the event of a grower preferring seedlings to worked trees, it would be advisable to specially select the seed; only taking it from desirable fruit growing at some distance from other citrus trees, in order to avoid any variations caused through cross-pollination.

The orange may also be propagated by means of layers and cuttings, or by baring and exposing portions of the larger roots, which forces a dormant bud into growth, and so a new tree is formed.

BUDDING.

Citrus trees may be grafted, but budding is preferred on account of being a much more easily performed, and therefore a quicker mode, of propagating varieties. It is performed in exactly the same manner as for other fruits, except that it is advisable to make the cross-cut on the stock below the vertical one, thus— \perp ; in which case the bud is pushed upwards. This is done to prevent water (rain) entering between the bark and the wood, thereby destroying the bud. When the bud has been inserted bind well above and below it with bandages dipped in melted wax, in the manufacture of which no fatty or oily substance has been used, as this is liable to cause the sap to sour in hot weather. Some writers state that when cross-pollination takes place a few buds immediately behind the blossom are temporarily influenced by the strange pollen; therefore, in order to avoid this, it would be better to select the bud from a vigorous, non-bearing branch.

STOCKS.

The question as to which is the best stock to use is one that lends itself to a great deal of discussion, and opens up a large field for the Experimenter, as an ideal stock in one locality may be a most dismal failure in another. I will briefly outline an experiment which would, in my opinion, settle the following points, viz.:—

1. The merits of the different stocks as disease resisters in various parts of the Colony.
2. The influence of stocks on the vigour and productiveness of trees.
3. The influence (if any) of stocks on size, flavour, etc., of fruit.
4. To test the keeping and carrying qualities of fruit from various stocks.
5. The addition to the set of a seedling of the same variety, thereby obtaining data as to the relative merits of budded trees, versus seedlings, etc., etc.

The experiment to be run somewhat on these lines. Let a good variety of orange be worked into sets of, say, half a dozen different citrus stocks; this work being done at the Government Experiment Orchards. These sets, with the addition of a seedling of the same variety, to be distributed, when ready, free of cost to one fruit-grower in each of the

orange-growing districts of the Colony, such person to be nominated by the Fruit Growers Association, or the Agricultural Society of the district.

By so doing we would enlist the sympathy of those most interested in the work, and there is no doubt that, with a number of farmers, one practical demonstration of this description would prove more convincing than chapters of the most conclusive proofs written in regard to experiments conducted at a distance. There would, of course, be certain conditions and details connected with such an experiment, which need not be gone into at the present time.

Reverting to the subject of stocks, the experience of America and Australia seems to prove that the sour orange is the most resistant to such diseases as the gumming disease (Mal-de-Gomma) and die-back, but even this stock will not thrive on poor, unretentive soils subject to droughts, whilst the sweet orange, *C. aurantium*, and the Lemon, *C. limonum*, have proved most liable to the ravages of the above-mentioned diseases. Other stock used are the Shaddock, or Pummelo, *C. Decumana*, the Citron, *C. medica Cedra*, and the larger varieties of Lime, *C. medica acida*. Two very hardy species, *C. Otahietii*, and *C. trifoliata*, are sometimes used for dwarfing the orange.

Care should be taken, whilst the trees are in the nursery rows, to train them to a single stem, so as to form well-shaped trees, neither too lanky, nor yet branching, within an inch or two of the bud, as I have seen them sent out by nurserymen. It is a very simple matter to go along your rows and remove any shoots below the height you desire your tree to branch, and by so doing you will save both time and labour, and your trees a lot of unnecessary hacking.

Some nurserymen force the growth of their young trees by means of liberal doses of artificial fertilisers. This system cannot be denounced too severely, as when the trees are removed to a poorer soil, they receive a check, lose their healthy dark-green appearance, which is replaced by unhealthy foliage of a yellowish hue; and in this condition the tree falls an easy victim to any disease or insect pest which happens about.

PLANTING OUT.

Before the trees can be set out, it is necessary to peg off the land in such a manner as to have a peg marking the future position of each tree. The following method is as good as any, and if properly done will give straight rows, not only at right angles to one another, but also diagonally. It will be desirable to take a road or fence as a guide in pegging off your base line. Measure off equal distances from the fence at each end of the field, and drive in stakes, then between these stakes stretch a cord or line previously marked off into proper distances, say 20 feet, by sewing or tying with pieces of coloured twine, and at each of these marks drive in a peg. The next thing required is to peg off

another line at right angles to the base line; and to get a true right angle, proceed as follows:—

With your cord measure off 60 feet, as nearly at right angles to the base line as you can guess, putting in a peg every 20 feet, turn the cord round the 60 feet peg, which we will call the Peg A, and run it to the fourth peg, marking 80 feet along the base line, which will be known as Peg B.

If it is a true right angle the distance between these two Pegs A and B—which line forms the third side of the triangle—should be 100 feet; if not move the Peg A on the side line until it comes right. This line can then be extended as far as required, by sighting along the pegs already in position, after which it is a simple matter to fill in the square.

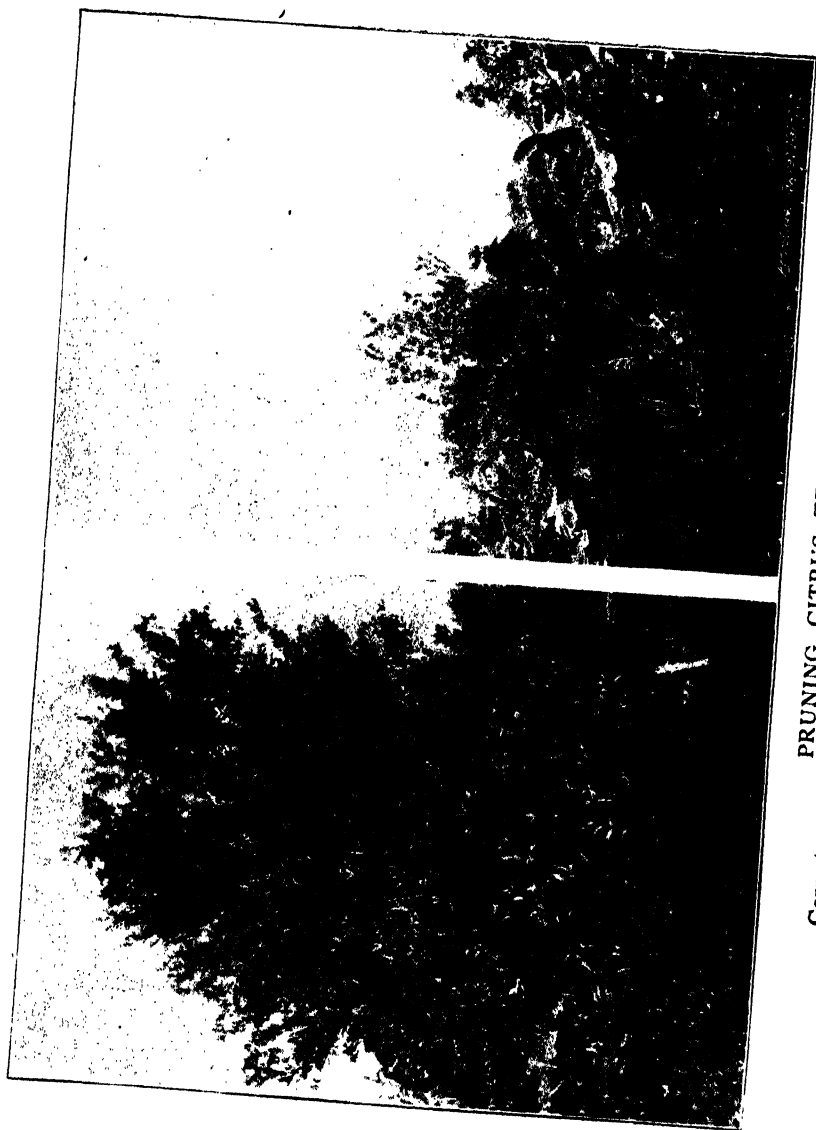
The field having been pegged off, it will then be necessary to have a planting board, by the use of which we are enabled to set the tree in its exact position, and thereby keep the rows intact. Take a piece of plank, say 5 feet 6 inches in length, in the middle cut out a small V shaped piece, and at equal distances from the centre of this V, say 2 feet 6 inches, bore a hole at each end of the board about 1 inch in diameter, or large enough to allow a peg to pass through freely. When about to plant, the board is placed so that the peg marking the position of the tree fits into the V, and two more pegs are driven through the holes, when you can shift plank, remove the middle peg, and dig the hole. Replace board over pegs, set your tree, and by bringing the trunks into the V, it will be in its exact position.

Orange trees, being evergreens, may be planted out at any time; but, in the Coastal districts, if planted during the winter, they should be watered periodically; whilst in up-country districts, I would advise earlier planting, so as to ensure the trees getting a good root-hold before the frosty weather commences.

In removing trees from the nursery, a number of the small fibrous roots, through which the plant food is assimilated, are bound to be severed, which will necessitate a shortening in of the tops; otherwise the area of leaf-surface, through which evaporation is constantly taking place, will be more than the reduced root-system can support.

The roots should be smoothed out evenly, all bruised or broken parts cut away, and have fine earth worked between them by hand, after which it is advisable to fill all interstices, and settle the earth around the roots by watering freely. Great care should be taken that the roots of the trees are not left exposed to the drying influences of the sun or wind. Never set your trees lower than they originally stood in the nursery, it being better to err on the other side, especially in well-watered localities.

The next thing to be considered is, at what distance apart orange trees do best. In this one must be guided, to a great extent, by the class of stock used; a dwarf stock, for instance, produces a much smaller



Correct.

PRUNING CITRUS TREES.

Incorrect.

tree than would the lemon or sweet orange, therefore the latter would require much more space than the former. If worked on dwarf stocks sixteen feet will, I think, be found ample; whilst trees on other stocks, and seedlings, should be set out from 22 feet to 30 feet each way, it being better, in my opinion, to give them too much rather than too little room. A grower, in considering this question, should also be influenced by the quality of his soil, it being obvious that a rich, well-drained soil will produce a larger tree than a poor, sodden soil.

PRUNING.

If they have been well cared for whilst in the nursery, the result will be trees with compact, well-shaped heads, consisting usually of three or four shoots on a single stem, the bottom shoot being 12 inches to 15 inches from the ground. With a tree of this description very little pruning will be necessary, beyond removing water-shoots, or long thorns liable to puncture the fruit, cutting out crossed, or crowded branches, and all dead wood. Some vigorous growing varieties have a tendency to form a dense mass of foliage towards the centre of the tree, thereby shutting out the light, preventing free circulation of air, and affording an ideal hiding-place for pests and diseases. In this case it is necessary to resort to thinning out, by removing enough of the young shoots to admit light and air, and free entry of sprays to the centre of the tree. Although the orange can be cut back severely, it is only done in exceptional cases, therefore as long as the tree is growing and bearing well, it is better to leave well alone, and use the knife sparingly.

SOIL AND CULTIVATION.

The orange will grow on almost any class of soil, provided, of course, that it is not swampy. On light sandy soils it will bear for a few years, after which the growth becomes less vigorous, plainly showing that the supply of plant food is becoming exhausted, and requires replenishing; whilst on heavier loamy soils it has a much longer life. In one of the largest and best orange-growing districts known to the writer, the soil varied from a good, gravelly loam to a strong loam overlying a gravelly subsoil, and the healthy dark-green foliage, and heavy crops of fruit, borne by the trees was convincing proof that this class of soil is one of the best for oranges. The gravelly subsoil, in this case, ensured perfect drainage, which is one of the essential requirements in successful fruit-culture, as trees cannot possibly thrive with stagnant water lying about their roots. The orange likes plenty of moisture, but the water in the soil must not be allowed to stagnate, but kept moving by means of either natural, or artificial, drainage.

Before planting an orange grove the land should be ploughed 12 inches to 15 inches deep, which may be done by a second plough following in the furrow made by the first, or by stirring to the required depth with a subsoil plough. By so doing the under soil is opened up to the

sweetening influences of the air, retains its moisture better by breaking up the capillary tubes at a lower level, and encourages the tree to send down its roots, instead of forming a mass of surface roots, as is the case with shallow cultivation on stiff soils. These surface roots interfere with, and are being constantly severed by, the tines of the cultivator, and in hot countries, subject to spells of dry weather, are liable to be dried out with most disastrous results to the tree.

Having ploughed deeply, it will be necessary to bring the soil to a fine state of tilth by the use of disc-harrows, harrows, etc., so as to ensure a sufficiency of fine earth to work in between the roots of the young tree, which would otherwise be better left unplanted. The after cultivation will consist of ploughing once a year (preferably in the winter when the trees are dormant), and is best done with a light pony plough, care being taken to have a narrow whittle-tree, and so prevent damage to the trees. During the growing period it will be necessary to keep down grass and weeds, and keep the surface of the soil well stirred by the frequent use of a cultivator. On light sandy ridges in districts frequently subject to very strong winds and heavy storms—such as the Coastal districts of Natal—growers may find it advantageous to allow grass to grow between the trees. On steep slopes, where the surface soil is kept loose by constant cultivation, these storms remove tons of earth and wash out deep gutters; and in dry weather the loose sand picked up by the wind has a defoliating effect on the trees. Such has been my experience with trees and vines at Winkel Spruit, but, since allowing these wind-swept slopes to revert to grass—which is cut periodically—the trees are making splendid growth. This cut grass forms a mat of decaying vegetable matter on the surface of the soil, which, when ploughed in, adds humus, and tends to give more body to the soil manuring.

One cannot reasonably expect land, from which heavy crops of fruit are harvested year after year, to retain its fertility and continue productive unless the elements taken up as plant food and used in the growth of the tree and production of such crops are restored to the soil in the form of fertilisers. The science of Chemistry, as applied to agriculture, has rendered great service in finding out what these elements are and in what percentage they are taken up by the various crops. From analyses by Mr. G. E. Colby, of the University of California, I take the following:—"The total ash from 1,000lbs. of fresh fruit (oranges) was 4.32lbs., equal to 2.11lbs. of Potash, .97lbs. of Lime, .53lbs. of Phosphoric Acid, and 1.83lbs. of Nitrogen." Thus, by means of this analysis, we are enabled to compute approximately the weight of these materials actually transported from the orchard soil in our orange crop.

Then from the results of experiments conducted in America we glean the following:—

1. That potash used in excess tends toward the production of sour-fruit with thick tough rind.

2. That phosphates are supposed to increase and hasten the bearing capabilities of the tree, and rectify the acidulous properties imparted by the potash.

3. That organic nitrogenous manures, *i.e.*, those obtained from the decomposition of animal or vegetable matter, if used at all, would be better applied in light dressings, as otherwise thick-skinned, insipid fruit and a rank, unhealthy forced growth of wood are produced; and in this state the tree is unable to withstand attacks of pests and diseases, and that it is, therefore, preferable to use the inorganic or mineral forms of Nitrogen, such as Sulphate of Ammonia or Nitrate of Soda.

Thus, a well-balanced admixture of commercial fertilisers, in the proportions indicated by an analysis of the soil to which it is to be applied, and the requirements of the crop to be produced, will undoubtedly give the best results.

Soluble manure may be broadcasted through the orchard, or well worked into the soil in the vicinity of the trees; but insoluble manure should be sown in a trench nine or ten inches deep, dug a few feet from the trunk of the tree (the distance varying according to the age of the tree). The reason for this is that the effects of insoluble manures (take, for instance, coarsely ground bone meal) will remain in the soil for years, and if not sown deeply will encourage the growth of a network of roots near the surface of the soil, which, for reasons already stated, is undesirable.

INSECT PESTS AND DISEASES.

Most, if not all, of the pests and diseases attacking citrus fruits in Natal have been fully dealt with by the Government Entomologist in his Bulletins and the *Journal*, and anyone requiring further information on this subject would do well to write, also sending specimens, to the above-mentioned gentleman, Department of Agriculture, Pietermaritzburg.

VARIETIES.

When planting it would be advisable to select both early and late ripening varieties, so as to obtain succession crops. This gives more time for proper handling in harvesting and marketing, and obviates the necessity of having to place the whole of the crop on, may be, a glutted market. There are a large number of varieties to choose from, and they are continually being increased by the addition of seedlings of special merit.

The chief points to be considered in choosing varieties are:—

1. Tree to be a vigorous grower and good cropper.
2. Fruit, medium to large in size; skin thin, smooth and of showy appearance; flesh solid, melting and juicy, with few seeds; flavour a fine blending of saccharine and acidulous properties, neither insipidly sweet like some varieties of the sweet China family, or with vinous properties too strongly marked, as is the tendency in some varieties of the Portugal family.

3. In view of the bright prospects of a successful export trade, it is essential that only such varieties as are good keepers and shippers be selected.

Although it is well nigh impossible to get an orange perfect in every detail, still, I think, in the main the following varieties meet the above-mentioned requirements, viz.:—Maltese Blood, Parramatta, Homosassa, Magnum Bonum, Parson Brown, and Whitaker, which ripen fairly early, and Mediterranean Sweet, Jaffa, Valencia Late, Hart's Late, and Peerless, which are late ripening varieties.

The Seville, or Bitter Orange, is also grown extensively, the fruit being largely used in the manufacture of marmalade.

THE NAVEL ORANGE.

This orange was originally imported from Brazil by the United States Department of Agriculture, and has since spread to every part of the world, suitable for orange-growing, under the name of Washington Navel, or Bahia. The fruit is large, with smooth, silky skin; flesh solid, juicy, of delicious flavour; and is free from seeds, and a good keeper. These good points all combine to make it about the best orange cultivated. The Navel orange would undoubtedly be grown far more extensively but for the fact that they are inclined to be shy bearers, and require a rich, open, well-drained soil. There are a number of sub-varieties, all differing slightly from the type. In the Australian, for instance, the Navel is much larger. Most of them blossom freely, and set their fruit, but it falls off when quite small, and, though in some localities they grow satisfactorily, in others the crop is too light to be payable.

THE MANDARIN ORANGE. CITRUS NOBILIS.

This seems to be a distinct family, and is also supposed to be indigenous to South-Eastern Asia. The fruit is flattened, segments easily detached surrounding a hollow centre; skin smooth, of fine texture, and when ripe loosely adhering; flesh of delicate flavour, juicy and melting; but when over-ripe is inclined to become dry and fibrous.

The Tangerine is another section of *Citrus nobilis*, which closely resembles the Mandarin, the main difference being in the colour of the fruit, which, in the latter is yellow, whilst in the former it is more of a reddish hue.

HARVESTING AND MARKETING.

The care bestowed on the fruit from the time it leaves the tree has a greater influence on the keeping qualities than is apparent to the casual observer, and on it depends the success, or failure, of the shipment, more especially with regard to fruit intended for a distant market.

The exact degree of ripeness at which to gather oranges will soon be found out from experience by an observant grower. If it is intended for shipping to a distant market the fruit may be picked as soon as the rind has coloured evenly, and before it is fully ripe; whilst for the local

market it is better to allow it to hang longer and more fully mature. Fruit affected by scale, or defective otherwise, should never be sent to the English market. Badly bruised, or punctured fruit, should on no account be mixed with good, sound fruit, as the former will quickly decay, and the gases, etc., given off in decomposition will probably damage the latter.

Fruit should never be pulled, on account of the liability to rupture the skin, which causes decay, but should be cut off, leaving about one quarter of an inch of the stalk on the fruit. This is best done by means of proper lemon clippers, there being a danger of cutting, or grating, the fruit when a knife is used. Each fruit as it is clipped off should be carefully deposited (not thrown or dropped) in handy-sized cloth-lined baskets, having a hook attached so that it can be hung on the rungs of the ladder, thereby allowing free use of both hands for gathering. When full, the basket is taken down, and the fruit is transferred, singly, to the sweat-boxes, which are then removed to the packing-house, where the fruit undergoes a process of curing or sweating.

The rind of the orange contains a large number of small oil cells, which are very easily ruptured; and the object of sweating is to remove, by evaporation, sufficient of this oil, and other moisture, as to cause the rind to dry and soften slightly; also, to allow time for developing any defect in the fruit caused by bruising or rough handling. The time required for sweating will vary from about three days in fine bright weather to five or six in damp, muggy weather, and probably longer if the fruit has been gathered in the rain. The chambers should be well ventilated, and the boxes stored in such manner as to allow a current of air to freely circulate between them.

It sometimes happens when an orchard is situated alongside a main road the dust created by the traffic settles on the fruit, leaving it in a dirty condition; fruit of this description, also smutty fruit, should be well washed and *thoroughly* dried before packing.

When the fruit is ready for packing it should be graded—if not previously done in the orchard—for size, colour, and perhaps shape; and then each fruit should be wrapped in tissue paper, which gives a more finished appearance to the packing, and minimises the danger of sound fruit being damaged by an odd one decaying on the voyage. These wrapping papers are usually cut about 10 inches by 10 inches, and the operation is performed very expeditiously by laying the paper on the palm of the hand, then place the orange in the centre of the paper, gather up and wrap snugly round the fruit, finally twisting the ends round the stalk, thereby preventing any possibility of other fruit being punctured. Pack the fruit firmly and evenly into the cases, but not too tightly; and it would be better to allow the contents to project a little above the sides, so that when the lid is nailed down there will be no rattling or shaking. Another reason for this is, that with fruit kept for any length of time,

there is always a shrinkage in the bulk caused by drying out, and spaces also occur through the decay of odd fruits. Only pack one size of fruit in each case, and in the event of a small space occurring fill it with wood-wool, but never try to crowd a smaller orange into it, as it would spoil the look, and probably the sale, of the whole case. Again, never countenance the foolish and dishonest practice of topping off your cases with superior fruit, as the brand of a grower doing this soon becomes known, and his fruit does not meet with a ready sale.

The cases should then be neatly stencilled with brands indicating the nature, number and grade of the contents, the name and address of the consignee, and the private mark or brand of the sender.

The question of cases would be best left in abeyance until the return of Mr. Sim, who will then be able to place us in possession of information regarding the class of case mostly favoured by the wholesale buyers on the English market, and when no doubt a standard size for Natal will be decided upon.

I see by the *Journal* for February, 1907, that the dimensions of the case recommended for immediate use are 24 inches by 12 inches by 3 inches. This is a nice, handy case, with an outside measurement of 2,304 cubic inches, which allows 30 cases to the shipping ton of 40 cubic feet.

I also notice that Mr. Anderson makes no mention of a central division in these cases, which I think will be found necessary for the following reasons:—

1. Quarter inch material with a two feet span will, I think, be found too frail for the weight of the fruit, and therefore liable to break or tear away in handling, slinging, etc.

2. The weight of the fruit, in causing the boards to sag, affords space and allows the fruit to move.

3. If a number of these cases are stacked one on top of the other, I think it probable there will be too much weight on the fruit in or about the centre of the bottom cases.

With regard to unmarketable damaged fruit, this may be used in the manufacture of citric acid, etc., but should be dealt with by a Co-operative Fruit-growers Association rather than individual growers.

The *Practical Farmer* gives this method of selecting calves to raise, which is allowed by many successful dairymen: Turn the little calf on its back and see that it has four well placed teats, that is, wide apart, and two rudimentaries, or extra teats. Next see that it has a large udder cord which you can feel on the side, rubbing the finger back and forth. Such parts are made in proportion, and a large udder cord indicates that the calf when it becomes a cow will carry a large udder, because a large cord is necessary to hold this up. Next look in the calf's mouth, and if there are eight teeth well through you can safely raise that calf. If there are only two teeth put through reject the calf, because, as a rule, this indicates the constitutional vigour of the mother was not sufficient to mature the calf fully before it was born. Such a calf will be likely to have a weak vitality when it grows up, as well as during its younger days.

Export of Natal Fruit.

ABOUT the middle of February a cable was despatched to the Agent-General in London requesting that 15,000 cases for naartjes and 4,000 for oranges, together with a sufficiency of wood-wool and wrappers, might be obtained and forwarded to Natal.

The Minister of Agriculture has now received communications from the Agent-General relative to these cases and to the packing of fruit generally.

An order for the 19,000 cases has been placed with a leading firm in London, and the Agent-General reports, under date 1st March, that the whole order would be filled in three weeks' time, the boxes being sent in three weekly shipments.

Sir William Arbuckle's communication contains some interesting suggestions and recommendations. He has had several interviews with experts in the fruit trade, some of whom favour the idea of dividing fruit boxes in two by a wooden partition, whilst others are adverse to the suggestion. In the boxes which are being sent no partitions have been inserted.

The Agent-General suggests the first shipment of fruit should consist of one-half packed in partitioned and one-half in non-partitioned boxes.

Citrus fruit cases are of two descriptions—closed and ventilated. A considerable proportion of the fruit from the Cape is placed in closed cases, but citrus fruits from the Mediterranean arrive in London mostly in cases with a space for ventilation of about a quarter of an inch between the boards forming the sides. The Agent-General has therefore given instructions for a space of about a quarter of an inch to be left between the boards forming the lid and bottom in the boxes which are being consigned to Natal.

Dealing with the question of fruit boxes, the Agent-General has come to the conclusion that it would be preferable if boxes could be manufactured in Natal. The cost and freight of imported cases are two heavy items, which materially add to the price of the fruit delivered in England. Sir William considers that, unless the boxes can be made locally, Natal fruit-growers will be considerably handicapped in their competition with Mediterranean and other fruit. It is understood that Cape Colony is discontinuing the importation of English-made fruit-boxes, and is making them locally from poplar wood.

Appearance is the greatest factor in determining the value of fruit in the English market; and Sir William Arbuckle suggests that future supplies of wrappers should be stamped with the Natal Arms, in order to give the fruit an attractive look. He has forwarded a specimen of a silver-leaf wrapper which is extensively used for boxes of 50 tangerines

intended for the Christmas market, and Sir William is of opinion that boxes of 50 or 100 packed in a similar wrapper (over the ordinary paper wrapper) would prove more tempting to the purchaser than those bearing paper wrappers with simply the words "Natal Fruit" on them.

In conclusion, the Agent-General emphasises the necessity for despatching only carefully selected fruit, and for grading and packing the fruit in the most tasteful manner, so as to appeal to the English purchaser.

The South African Exhibition.

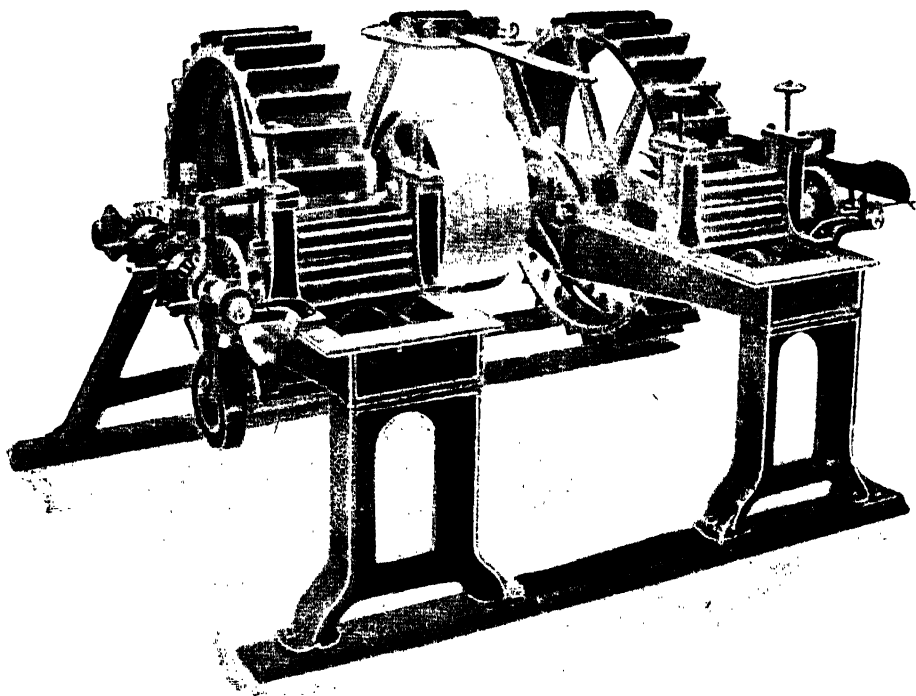
NATAL'S POSITION.

NATAL has come well to the fore in the South African Exhibition, and her various products have attracted much attention. The Agent-General states that he is receiving several letters day by day from important firms interested in the tea and fruit trades. There have also been many enquiries at the Exhibition itself after Natal products.

A considerable quantity of our produce has been sold, particularly pineapples. At the Exhibition every endeavour was made to let visitors test the flavour of the Natal pineapple. "Everyone who tastes it," remarked Mr. T. R. Sim to a *South Africa* representative, "remarks upon the luscious quality of the fruit, which, despite its small size, possesses a delicacy of flavour that is not met with in any other variety. It has often occurred to me that our little Natal pineapple is exactly suited for bottling purposes, and the preservers might do worse than consider the bottling of pineapples from Natal here, the price admitting, as it does, of such treatment."

Natal jams are pronounced by one newspaper to be "exquisite" in flavour. "There are no better jams made than Cape gooseberry, amatungula (an indigenous berry), pineapple, or guava," it is stated. The same paper speaks of "the famous Natal tea, which is scarcely distinguishable from Ceylon, and is quite as good in quality and flavour" (and yet there are many Natalians who will have none but the imported article!).

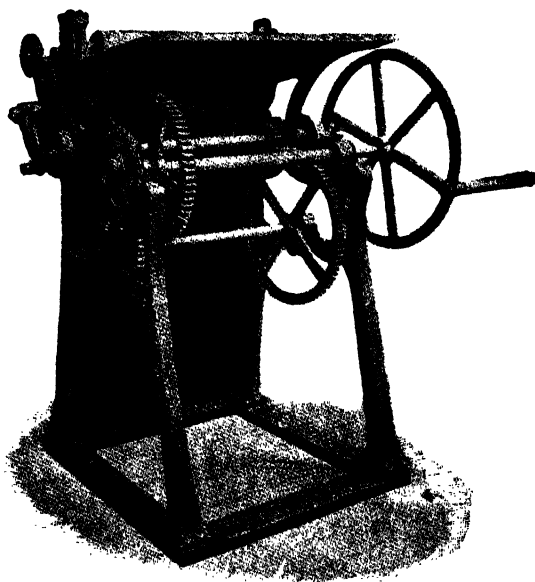
The Agent-General, in a letter to the Colonial Secretary, writes: "Their Majesties the King and Queen not only expressed their personal appreciation to Sir Peter Barn of the Exhibition and the arrangements on the opening day, but Lord Knollys has sent a special letter, by direction, reiterating their sentiments. The King and Queen and other members of the Royal Family made a close inspection of our exhibits under the guidance of Mr. Russell, Mr. Sim and myself, and expressed their appreciation of everything they saw."



DOUBLE RASPADOR WITH LATEST IMPROVEMENTS.

Wheel guards not shown.

(See Article on "Fibre," by C. Rositzky in last month's issue of the *Journal*.)



RAMIE DECORTICATOR.

(See Article on "Fibre," by C. Rositzky, in last month's issue of the *Journal*.)

Fibre Cultivation.

(A summary of Farmers' Bulletin No. 13, Department of the Interior, Bureau of Agriculture, Manila.)

A BULLETIN recently issued by Mr. H. T. Edwards, Fibre Expert, on "The Cultivation of Maguey in the Philippine Islands" gives much valuable information regarding fibre cultivation generally, which should be studied by those in Natal interested in that industry.

The maguey plant of the Philippine Islands, the fibre of which is known in Great Britain as Manila aloe and in the United States as Philippine maguey, and the henequin plant of Yucatan, which produces the sisal hemp of commerce, are closely allied species of the genus *Agave*. These two plants have the same habits and growth and are propagated and cultivated by the same methods. The fibre-extracting machines that are used for sisal can be used also for maguey.

The conditions which prevail in many parts of the Philippine Islands, and to which the maguey industry is peculiarly adaptable, are: A long dry season; large areas of arid, impoverished land; a limited supply of draft animals; the prevalence of insect pests and plant diseases; labour that is unaccustomed to the care of crops requiring intensive cultivation; and insufficient capital for the purchase of animals, implements and machinery. In the cultivation of maguey, these conditions are met with a plant that grows and flourishes through the longest periods of drought; that requires for its best development a thin, rocky, limestone, or coral soil, and which can be grown in beach sand; that can be produced on small farms without the use of a single animal; that is not seriously injured by any insect or plant disease; and that needs only a yearly, or semi-yearly, cultivation.

The production of sisal hemp has, within a comparatively few years, made Yucatan one of the richest States in the Republic of Mexico. The wonderful development of this industry is indicated by the imports of sisal hemp into the United States, which were, in 1891, 48,468 tons, valued at £779,598; and, in 1904, 109,211 tons, valued at £3,319,907, an increase in value of 328 per cent. in ten years.

The fibre of the henequin or sisal hemp plant has been utilised in Yucatan for centuries, but only within comparatively recent years has it become an article of commercial importance. The industry is supposed to have been started in Yucatan by the Toltecs about A.D. 1060. In 1783 a Commission appointed by the Royal Spanish Navy investigated this fibre and reported favourably concerning it. In 1839 an association was formed in Yucatan to promote the cultivation of henequin, but, owing to the fact that at this time all of the fibre produced was extracted by the use of crude, wooden implements, the industry was not

a profitable one. Realising the need of a fibre-extracting machine for henequin, the State Government offered a reward of 10,000 Mexican dollars (a little over £1,000) to the invention of a satisfactory machine. This offer resulted in the invention of the "raspador," from which have come the improved, automatic machines that have made the sisal industry what it is to-day. In 1875 the total export of sisal hemp from Yucatan was valued at £73,971. In 1900 it had increased to £2,355,840, and in 1904 it was £3,339,854.

From Yucatan, sisal hemp was introduced into Florida, the Bahama Islands, the Caicos Islands, Mauritius, the Hawaiian Islands, Cape Colony and Natal, West Africa, Australia, and India. In the Bahamas the sisal industry has attained considerable proportions, and is now firmly established. In Hawaii, 20,000 sisal plants were imported by the Commissioner of Agriculture and Forestry in 1893. Some years later the Hawaiian Fibre Company was formed, and it now has 850 acres of sisal under cultivation. It was estimated in 1903 that fully 10,000 acres of sisal had then been planted in Hawaii.

The henequin of Yucatan, *Agave rigida elongata*; the sisal of Hawaii, *Agave rigida sisalana*; and the maguey of the Philippine Islands, recently identified at the Royal Botanic Gardens, Kew, as *Agave cantala*, are very similar plants. All have the short, thick stem; the aloe-like cluster of large, fleshy leaves; and the tall flower stalk, or "pole," which bears a large number of small bulbils, or pole plants. The Hawaiian plant differs from that of Yucatan in having a shorter trunk: leaves smooth-edged, or bearing a few unequal teeth; and the fibre less in quantity, but superior in quality. The Philippine maguey plant has a short trunk; leaves from 4 to 6 feet long, from 2½ inches wide at the base to 4 inches wide at middle, and about 1 inch thick at the base; lateral teeth three-fourths to 1½ inches long apart; dark-brown terminal spine one-half inch long; and fibre finer, white, and longer, but less in quantity than either the Yucatan or the Hawaiian varieties.

The fibre of maguey is derived from the leaves, and is obtained by separating the pulpy portion of the leaf from the fine filaments, or fibro-vascular bundles, which run through this pulp. The fibre is white, or yellowish-white, in colour, 4 to 5 feet in length, fine and soft. Another marked quality is its elasticity, which gives it great value when used for cordage that is liable to be subjected to any sudden strain. In strength it is superior to coir, jute, sunn hemp, and Russian hemp.

Maguey requires neither a large, nor a continuous, supply of moisture, but rather an excess of hot, dry weather. It is evident, therefore, that the districts best adapted to the cultivation of maguey are those where there is a long dry season and a light rainfall. With an abundant supply of atmospheric moisture and a rich, moist soil, this plant will grow and flourish, but under these conditions the leaves develop a large amount of pulp and a small percentage of fibre. As the roots of the

plant are very sensitive to an excess of moisture. it is most essential that the soil be well drained. Worn-out "provision" and pineapple fields appear to be well suited to its cultivation—and equally to the cultivation of sisal.

In preparing the land for planting, any underbush, or other growth, should be cut and burned during the dry season. As maguey feeds heavily upon potash, the ash that is left from this refuse will furnish valuable fertilising material.

Maguey is propagated in two ways—from the bulbils that are produced on the central flower stalk, and from the suckers which grow from the roots of the older plants. The latter system is more widely followed. When the plant is from twelve to eighteen months old, it commences to throw out underground runners. The point of one of these, on reaching the surface, forms a sucker or shoot. From 30 to 40 suckers are produced by one plant during the first three or four years of its life.

The suckers that are to be used for planting may either be taken from the old fields and set out at once in the new plantation, or they may be thrown in heaps and allowed to be in the sun for six or eight weeks. The suckers so treated are said to produce longer and stronger plants than where they are taken direct from one field to another.

In planting, the distance between the rows and plants must not be too little, as many leaves are thereby torn and lacerated by the spines of adjoining plants, and the work of cultivation and harvesting is rendered extremely difficult. On the other hand, where the distance is too great, there is unnecessary waste of land. After long experience, the Yucatan planters have generally adopted the row system, with plants $4\frac{1}{2}$ feet apart in the row and rows 12 feet.

Mr. Edwards states that it was at one time the almost universal custom of Philippine planters to set out maguey plants 2 or 3 feet apart; but that on the Yutacan sisal plantations it had been thoroughly demonstrated that planting in rows 12 feet apart with plants $4\frac{1}{2}$ feet apart in the rows gave more fibre per acre and fibre of better quality than where the plants were set out closer together. The Philippine planter also frequently commenced cutting when the plants were but 2 or $2\frac{1}{2}$ years old. Following this first premature cutting, each year the plant was denuded of all but a few leaves. The system resulted in a weakened and stunted plant, and a considerable part of the immature leaves thus harvested contained but little fibre. The Yucatan system of cutting at one time only the mature leaves around the base of the plant keeps the plant always in vigorous condition and gives more and better fibre. Mr. Edwards states that with a more careful selection of suckers for planting, a better system of cultivation, and more judicious cropping, it is only reasonable to expect that the plant will be improved.

It has been thoroughly demonstrated that this system of planting

will give more fibre per acre and fibre of better quality than when the plants are set out closer together. The advantages of the row system are that it facilitates cultivation, admits air and sunlight, which are necessary to harden and strengthen the fibre, expedites the work of cutting and handling the leaves, and gives room for replanting when the old plants are approaching maturity.

A maguey field, after it is once well established, requires but comparatively little attention and cultivation. When the suckers have been set out with reasonable care, the loss will be small. Two or three times a year the fields should be cleaned of weeds and grass, care being taken not to bruise the leaves of the growing plants, as any such injury will result in a discolouration of the fibre. Suckers will begin to grow from the roots of the old plants in from twelve to eighteen months, and such as are not required for setting new fields should be removed and thrown away. The growth of a large number of suckers on any one plant not only lessens the vitality of the plant but also tends to hasten the growth of the pole.

As maguey fields give no return for three or four years, it is sometimes desirable, while the plants are small, to cultivate another crop on the same land. The practicability of doing this will depend largely on the nature of the soil, maguey frequently being grown on land that will produce no other crop.

According to the *Kew Bulletin*, 1892, at the Grenada Botanical Station, in the Windward Islands, one-half of a sisal field was planted with maize. It was noticed that the small sisal plants shaded by the maize made far greater progress than those without shade.

In the Bahama Islands similar results have been obtained with both maize and cotton. These crops are not only beneficial in furnishing shade, but they also keep down the weeds, and yield a product of more or less value. Sweet potatoes, which are frequently planted in abaca fields, should not be planted with maguey, as the vines would soon entirely cover the small plants and retard their growth.

The early or late poling of the plant is a consideration upon which may depend the entire success or failure of the industry. It is essential with a crop that yields no return for from three to five years after planting, that it shall continue productive for a considerable number of years without replanting. In the case of maguey, the growth of the pole, which is soon followed by the death of the plant, is in part the result of natural conditions, and in part depends on the variety and care of the plant. The life of the Yucatan sisal plant, after the first cutting of leaves, is from ten to twenty-five years; while that of the Bahama plant is from five to eight years. The longer life of the Yucatan plant is due to difference in variety, climatic and soil conditions, and the more careful system of cropping of the Yucatan planters. A humid climate and a moist soil tend to bring on early poling. The careless

cutting of leaves, and either long delay in cutting or over-cropping, have the same result. If the pole is lopped off as soon as it appears above the leaves, the life of the plant will be prolonged a year or more, allowing the leaves then on the plant to mature.

The number of years required for the production of the first cutting of leaves is variable, depending on the size and condition of the suckers when planted, subsequent climatic conditions, and on the nature of the soil. Ordinarily, the first crop of leaves will mature in three or four years. In Hawaii the first leaves are cut at three years from the time of planting in the field, or four years from the time of setting bulbils in the nursery. The Yucatan henequen requires from four to seven years to mature the first leaves.

It is customary to harvest maguey once a year, preferably during the dry season. In the wet season the leaves contain a smaller percentage of fibre, and the frequent rains interfere with the work of drying. Each plant should yield from 15 to 30 leaves annually. There is no fixed rule governing the time for cutting the leaves, and this matter is one to be determined largely by judgment and experience. Only those leaves should be cut which incline toward a horizontal position and show signs of maturity. As too much cutting will soon destroy the strongest of plants, constant care should be exercised against over-cropping.

In Yucatan the harvesting of sisal is done principally by Indians, who do this work with "corbas," the corba being a bolo having a blade curved at the end. An average day's work is from 1,500 to 2,000 leaves. Following each cutter is a woman, or boy, who cuts off the thorny sides and end spine of the leaves, and makes them up into bundles of fifty. These bundles of leaves are carried out to the roads, and transported on small tramcars to the cleaning machine.

Maguey leaves should be cleaned within twenty-four hours after they were cut from the plant. If left for a longer period than this, the fibre will become discoloured at the ends.

An average leaf of maguey is from 4 to 6 feet long, weighs from one to two pounds, and is about one inch thick at the base. It consists of a mass of cellular tissue, through which run the fibro-vascular bundles, or fibres. The work of fibre-extraction consists in separating the pulpy portion of the leaf from these fine filaments. There are two general methods by which this end is accomplished. The leaf may be placed in water until the pulp becomes so rotten that it can be easily removed by washing and beating; or the leaf while still green may be treated to some scraping process that removes the pulp and leaves the cleaned fibre. The first of these processes, known as "retting," is slow, expensive, and results in the production of inferior fibre. On all the larger sisal plantations fibre-extracting machines are now used.

The leaf of sisal hemp is practically the same as the maguey, and

can be cleaned by the same methods. Retting, however, has never been generally practised in the sisal-producing countries. Previous to the invention of a machine for extracting sisal, this fibre was cleaned in Yucatan by a scraping process. With the crude wooden implements which were used for this work, one man could clean only from 6 to 9 pounds of fibre daily.

The first machine used for cleaning sisal, which was the "raspador," was the invention of a Franciscan friar. This machine is still used to some extent, and all of the improved, automatic fibre-extracting machines that are used to-day for cleaning sisal and maguey are constructed on the same principle and are but improvements of this old machine.

The raspador consists of a 54-inch wheel which runs in a heavy wooden case. Across the 6-inch face of this wheel, about one foot apart, are placed brass scraping knives. The leaf is inserted through a hole in the case, being held by a clamp, and whips forward as the wheel moves around. A heavy curved block placed underneath is then, by means of a lever, brought to bear on the leaf, pressing it against the revolving wheel, which almost instantly crushes and scrapes away the pulp. The leaf is then withdrawn and the other end cleaned in the same manner.

On the sisal plantations the raspador has now been largely superseded by the "Prieto," the "Torroella," and other automatic machines, which clean from 50,000 to 150,000 leaves per day. When these machines are used, one-half of each day's cutting of leaves is reserved for the following day, so that the work of cleaning can commence in the early morning. The leaves are not, however, allowed to accumulate, as after twenty-four hours they begin to harden and are difficult to clean.

In cleaning with the improved automatic machines, the bundles of leaves are first placed on endless carriers, which take them up to the machine platform and drop them on the feed tables. The bundles are then broken and the leaves fed into the grip chains, which draw them into the machine. These machines have either two or three scraping wheels, similar to those of the raspador. On the grip chains the leaf is conveyed to the first scraping wheel, which instantly cleans one-half of it. It is then carried on to the second scraping wheel, and, in the case of the three-wheel machines, subsequently to the third wheel, which cleans the other half in a similar manner, the cleaned fibre being thrown out at the opposite end of the machine. One machinist is required to attend to the machine, one man to feed it, and two boys to receive and handle the fibre.

There are a number of different automatic fibre-extracting machines in quite general use in Yucatan. While each of these machines has its partisans, the "Prieto" appears to be in most general use. Ordinarily

these machines do not clean up to their full capacity because of the ignorance of the labour used to operate them. The machines used in Yucatan, and the cost of each, are shown in the following table, prepared from a statement made by the American Consul in Merida:—

Hemp-cleaning Machines in Actual Use upon the Plantations in Yucatan.

	Number of leaves cleaned in ten hours.	Number of men needed.	Actual horse-power.	Cost of Machine.	
				U.S. currency. \$	English currency. £
Lanaux reformed ...	150,000	4	25	3,003	625
Prieto reformed ...	150,000	4	16	3,689	768
Torroella reformed ...	100,000	4	16	3,003	625
Villamor reformed ...	100,000	7	16	2,145	446
Stephens ...	150,000	3	70	*	*
Solis ..	9,000	3	9	855	179

* No more being made.

The machine-cleaned maguey of Laoag is washed after it is taken from the machine, and is then dried in the sun. The sisal produced by the Hawaiian Fibre Company is washed as it passed through the machine. In Yucatan the fibre is not washed, but is taken from the machine, placed upon small trucks, and carried at once to the drying yards. In the yards the fibre is hung over galvanised-wire racks to dry in the sun. If allowed to remain any length of time after cleaning, without exposure to the sun, it will become dark and spotted. If exposed to rain or dew it loses its lustre. On one or two of the Yucatan plantations galvanised-iron piping is now used in place of wire, with satisfactory results. In Hawaii the wet fibre is taken from the machine and is laid on the ground to dry. While this method of drying gives a fibre that is straighter and, therefore, more easily handled in the baling press, its desirability is to be questioned.

When quite dry, the fibre is taken to the baling press, in which it should be laid straight without doubling over. On the smaller Yucatan plantations screw presses are used, and on the larger estates hydraulic presses. The weight of the Yucatan bales is variable, ranging from 14 to 16 arrobas, 350 to 400 pounds. The dimensions of a 15-arroba bale are 32 by 25 by 44 inches. Hawaiian sisal is put up in bales weighing 500 pounds, with dimensions of 54 by 30 by 30 inches. The bales are not covered, and are tied either with cheap rope or with twisted fibre. Practically all of the Philippine maguey fibre is shipped to Manila and baled on the abaca presses.

The annual yield per acre of maguey fibre will depend upon the number of plants to the acre, the number of leaves cut from each plant, the size and weight of these leaves, and the percentage of fibre which

they contain. These several factors are so variable, even on a well-organised plantation, that variations in the estimates of fibre yield are found. On two adjoining plantations, where conditions are apparently the same, quite different results may be obtained. The estimates made by authorities and by planters as to the average yield of sisal per acre range from 400 to 1,500 pounds.

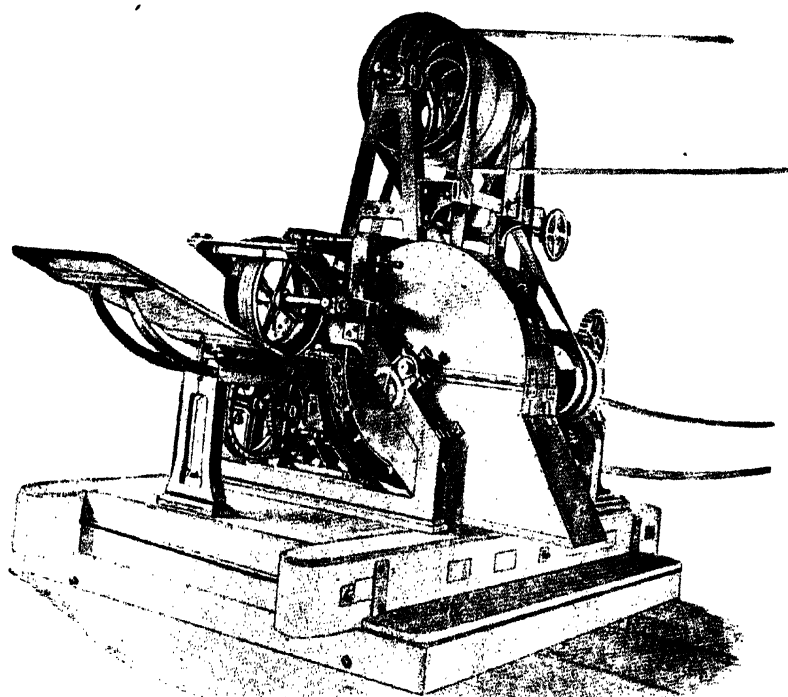
The yield of maguey is considerably less than that of sisal. This is due in part to the difference between the Yucatan and the Philippine plant and fibre; and, also, to the more highly developed system of cultivation of the Yucatan planters. Maguey fibre is finer than sisal, and from a given weight of leaves smaller percentage in weight of fibre is obtained than in Yucatan. With respect to cultivation, the close planting and over-cropping so commonly practised by maguey planters in the Philippines, result in the production of many small and undeveloped leaves.

In Yucatan it is generally estimated that 82 plants will give an annual yield of 100 pounds of fibre. On this basis, with plants set at $4\frac{1}{2}$ by 12 feet apart, or, approximately, 800 to one acre, the fibre yield per acre would be 975 pounds. Under average conditions, each plant should yield annually from 15 to 30 leaves, giving a total of from 12,000 to 24,000 leaves per acre. The fibre yield is, ordinarily, about 50 pounds per thousand leaves. The fibre yield from 12,000 leaves, at 50 pounds per thousand, is 600 pounds; and from 24,000 leaves, at 50 pounds per thousand, 1,200 pounds, or an average of 900 pounds of fibre per acre.

The following table, showing the results of experiments made by Dr. Charles Richards Dodge in Yucatan, indicates the average weight of leaves and the percentage of fibre which they contain:—

Lot.	Age. Years.	Weight, 10 leaves. Pounds.	Fibre Yield. Per cent.
1	5	20	3.27
2	10	10	5.57
3	10	15½	5.92
4	15	8½	7.67
5	15	14	5.64
6	30	8	6.87
7	32	15	5.88
8	7	21½	4.45

Samples of maguey forwarded to London in October, 1905, were quoted at £30 per ton, the London quotation for sisal on the same date being £37. Machine-cleaned maguey fibre forwarded to fibre brokers in New York City, in 1905, was reported to have approximately the same value as sisal. The usual New York quotations for No. 1 hand-



FIBRE MACHINERY.—“LA CORONA.”
(See Article on “Fibre,” by C. Rositzky, in last month's issue of the *Journal*.)

cleaned maguey are from one-half to three-fourths of a cent less per pound than for Yucatan sisal.

The following New York quotations for sisal hemp and for "Fair Current" Manila indicate the relative value of Manila hemp and good machine-cleaned maguey:—

	1902. *Cents.	1903. Cents.	1904. Cents.	1905 Cents.
August 2 :				
Sisal hemp	9½ to 10	7	7½	...
"Fair Current" Manila ...	10½	8	9½	...
November 1 :				
Sisal hemp	8½	7½	8	...
"Fair Current" Manila ...	10½	8½	9½	...
February 1 :				
Sisal hemp ... ..	...	7 to 7½	7½	7½
"Fair Current" Manila ...	...	8½	9½	10
May 1 :				
Sisal hemp ... ..	...	9 to 9½	8½	7½
"Fair Current" Manila ...	...	9½	...	9½ to 9¾

* Cent. = ¼d.

The most important use of sisal hemp and maguey in the United States is for the manufacture of binder twine. This fibre is also largely used for tarred lath and fodder yarns, and for other cordage purposes.

In Yucatan and South America sisal is employed for cordage, nets, lines, hammocks, saddle cloths, girdles, bridles, etc. The Yucatan sisal hammocks, made from carefully prepared, hand-cleaned sisal, are remarkably strong and durable.

In the Philippine Islands, particularly in the Visayas, considerable maguey fibre is produced for local use. The young and tender leaves are selected and are cleaned by the scraping process used for cleaning pineapple leaves. The fibre thus obtained is soft and fine, and is used for making delicate handkerchiefs and cloth. Maguey is also used to some extent in the localities where it cultivated for making various kinds of cordage.

A maguey or sisal leaf contains from 2½ to 5 per cent. of fibre and from 95 to 97½ per cent. of waste. On the Yucatan sisal plantations the fibre-cleaning machines are placed on raised platforms beneath which are small dump cars that catch the waste as it falls from the machine. This waste consists largely of water, which is allowed to run off; the remaining soft, green pulp and short, broken fibre being run out on the cars to the dump pile.

In Hawaii an attempt is now being made to separate and clean the short fibre that is in the waste, and to utilise this fibre as a filling material for mattresses. The waste fibre is first separated from the pulp with an ordinary pitchfork. It is then steamed to remove the odour, washed, dried in the sun, and passed several times through a picker and cleaner. This process requires so much time and labour that its utility is doubtful.

It has been fully demonstrated that an excellent quality of paper

can be manufactured from maguey waste. The principal obstacle to the use of the waste for this purpose is the difficulty and cost of collecting it in sufficient quantity. The use of fibre-extracting machines will result in the production of large quantities of waste when it can be easily and cheaply handled, and will introduce the question of utilising this waste as a paper-making material.

Although the maguey plant seldom suffers any injury from either insect pests or plant diseases, an insect is found in Yucatan, and a fungus disease the Bahamas, both of which do some little damage on the sisal plantations.

In Yucatan an occasional plant is destroyed by a large black beetle, known as the "max," the life history of which is described by Dr. George F. Gaumer as follows:—

"The female insect lays its eggs on the trunk of the henequin plant a few inches above the ground. When hatched, the larva burrows into and through the outer bark to the harder fibre of the interior, when it generally takes an upward direction and burrows from 6 to 12 inches during its larval existence. When full grown it works its way to the bark, where it changes to a pupa, and so remains for some months, when it hatches into the adult beetle and emerges from the plant, which it leaves injured and weakened, but rarely kills. Three or more larvae in the same plant will surely destroy it, but that number is of very rare occurrence."

The fungus disease that has appeared in the Bahamas is described by Lyster H. Dewey, Botanist in charge of fibre plants. United States Department of Agriculture, as follows:—

"When I was in the Bahamas last May, I noticed that there were in a few localities indications of a diseased condition of the sisal plants. I brought back with me some specimens and referred them to the Plant Pathologist of the Bureau of Plant Industry, who reported the presence of a fungus on the leaves, but that it was not in a condition for determination. Recently I have received from one of the principal growers in the Bahamas a letter stating that, while the diseased condition seems to be confined to small areas, it is slowly spreading and causing some alarm lest it may prove destructive."

The symptoms are described at follows:—

"Yellowish spots or patches are first observed on the leaves. These spots spread. The leaf gets dry and curls, usually half way down from the point; the edge of the leaf becomes pinkish in colour. In a week, sometimes longer, the leaf dries and becomes black and hard. Usually the upper half of the leaf is affected, the lower half remaining green much longer. Sometimes the funnel, as it is called in the Bahamas, consisting of the unopened leaves, is attacked at the tip. The disease usually affects only 5 or 6 inches of the upper part of the funnel, but sometimes extends clean to the base.

"This condition has not been observed in the Bahamas until within the past year. It may have existed before, but to so small an extent as to be regarded of no importance.

"I would suggest that the sisal growers of the islands be warned in regard to the possible introduction of such a disease, and that they be urged to go through their plantations, and, if any sisal plants are found exhibiting symptoms of the character described, they should be grubbed out and destroyed."

Plantations should be watched for the appearance of either injurious insects or fungus diseases, as these enemies are much more easily checked in the beginning than after they have become numerous and widespread.

The maguey plant is not affected by hot weather or killed by drought. An exceptionally long period of dry weather may slightly check its growth, but will not seriously injure the plant. Its greatest enemy is fire. When a large quantity of dry rubbish is allowed to collect in the field, and particularly around the plants, there is always danger of fire. If, under these conditions, a fire is once started, it may cause a total loss of the crop.

Mr. Edwards concludes by stating that the cultivation of maguey offers inducements to the small farmer and to the planter with large estates. While the future price of maguey fibre, as of any other agricultural product, cannot be predicted with any degree of certainty, this fibre is a staple commodity the use of which promises to increase quite as rapidly as does its production.

Natal Orchard Association.

SUGGESTIONS TO SENDERS OF FRUIT.

THE Natal Orchard Association has issued some "Regulations and Suggestions" for senders of fruit. It is pointed out that the forthcoming export is of a more or less experimental nature, and that (which must be clearly understood by all senders) it is only by a close application to the details of preparing and packing the fruit that senders can hope for success. The grower is the only one who can judge of the ripeness and suitability of the fruit for export: consequently he must only send exactly what is mature. Closest attention must be given to grading and cleaning of fruit from scale. Further, all fruit must be wrapped in the printed papers supplied by the Association. The grade for oranges will be as follows:—1st, 10 inches, and 2nd, 9 inches.

Prior to any boxes, etc., being sent to Durban, it is essential that

each grower shall sign a guarantee* indemnifying the Association against loss on their own consignments, also their *pro rata* charges. Immediately the exact number of cases or boxes is known, the grower must advise the Secretary of the Association of the full particulars, viz., number of cases or boxes, nett contents, measurement, and weight. All consignments are to be railed (carriage paid by grower) direct to the African Boating Company, Point. Growers should so arrange their cutting, etc., as to allow of the fruit being received at the Point early on Wednesday morning, in order that fruit may be examined prior to shipments, and also that there may be no excuse for rough handling in the actual process of loading. Growers must adhere as near as possible to the quantities promised, as it is quite probable that the first shipment or two will not realise quite as much as it is hoped, but it must be understood that the average price throughout the season is the only fair way to judge if the market is remunerative or otherwise.

Boxes will arrive during April; and growers must inform the Secretary of the Association at once how many boxes, etc., they will require of each size. The sizes run:—No. 1 tray, 18in. x 12in. x 2½in., to hold 24 selected naartjes; No. 2, to hold 100 naartjes, 1st grade, size 24in. x 12in. x 6in.; No. 3, size 24in. x 12in. x 8in., to hold 56 oranges. Boxes, etc., will be despatched from the Point immediately on arrival, carriage forward, or, in cases where the carriage has to be prepaid, a remittance must be sent immediately on receipt of debit note for same. Wood-wool and wrapping papers will be debited to each grower, and recovered by the Association debiting the amount against account sales. The same course will be adopted in regard to freight paid by the Association, consequently the only initial outlay to the grower will be the paying the carriage to the Point. A debit note will be sent with each rail advice note of boxes, etc., and growers are requested to note that no claim for short delivery will be taken notice of unless made within three days of receipt of shooks, etc.

Every grower must register at once the brand, or initials under which he intends to ship, each box to bear the said brand or initials, with the name of fruit and quantity clearly stencilled on at least one end, preferably both. Sets of stencils for the purpose are supplied by the Association.

No. 1 trays must be made up into crates, or bundles of four boxes, allowing battens for ventilation. Nos. 2 and 3 boxes must have the batten nailed on the bottom of the box at both ends.

The first shipment will be sent as follows:—A portion as “deck cargo” and “between decks” (rate 25s. per cubic ton, or 7½d. per No. 2 box), a portion in “cool chamber” (rate 70s., plus 10 per cent., or, say,

* Printed guarantee and supply forms may be obtained from the Secretary of the Association, 13, Castle Buildings, Durban.

1s. 10d. per No. 2 box). The different parts of the ship where the fruit is to be stored will be apportioned as equally as possible to minimise every sender's risk, but it is advisable that all "trays" (selected fruit) should go in the "cool chamber." Growers can, however, specify how they would like their fruit sent. If by cool chamber, the boxes or package of trays must have the words "Cool Chamber" stencilled on the lids.

Account sales will show the actual gross amount realised on each consignment, less the total amount of London charges (say about $7\frac{1}{2}$ per cent.), and the detail of Natal charges, viz., wharfage $\frac{1}{4}$ per cent. on value, exchange, stamps, and Secretary's commission $2\frac{1}{2}$ per cent. The detail of London charges (if any) can be obtained, or sender can see the original account sales at the office of the Association.

It has been arranged that Mr. F. L. White will travel to England with the first shipment, and he has kindly consented to make a daily report on the condition of the fruit stowed in the various parts of the ship, and also to assist and advise the London agent for the first three shipments as to the best means of disposing of it either in London or the provincial towns. Fruit for the first shipment will be inspected by Mr. White, the Government packer, and the Secretary of the Association, who, if they consider the quality or condition unsuitable for export, may either reject it or have it sold apart in London as unguaranteed fruit. Subsequent shipments will be examined by a member appointed for the purpose, assisted by the Secretary of the Association. All fruit sent will be insured against "total loss."

It may be of interest to growers to export other than naartjes and oranges, such as Seville oranges, shaddockes, Spanish lemons, etc., in which case the London agency will communicate with jam makers, etc., in order to find a remunerative outlet.

Growers must realise that a certain amount of initial outlay is required in every new venture. Also, a considerable amount of extra labour will be entailed, as otherwise, if indifferent fruit is sent, the sale of Natal fruit will be spoiled, and it will take years before the lost ground is recovered. The success of the export of fruit rests solely with each grower, who, by careful attention to the details, however seemingly trivial, will help to build up a connection with the largest and best market in the world, that will prove of inestimable advantage to growers in particular and to the Colony in general.

It is hoped that this experimental export will prove to growers the vital necessity for co-operation amongst growers, and that with the little "give and take" that is necessary in a society of this nature, growers will be able to realise that the old motto, "Unity is Strength," is as true to-day as when it was first uttered.

Bacon Factories.

At a recent meeting of the Gloucestershire Chamber of Commerce, Mr. Lodon M. Douglas addressed the Chamber on the subject of a proposed bacon factory for the county.

During the course of his remarks, Mr. Douglas said the value of the pig is becoming greater every year, owing to the immense improvements which have taken place in connection with dairy farming, as it has long been proved that the best use to which the separated milk in connection with creameries can be put is to convert it into bacon.

Much, of course, depends upon the pigs that are grown. In the United Kingdom there are six recognised breeds, namely, small white Yorkshires, middle white Yorkshires, large white Yorkshires, Tamworths, Berkshires, and Suffolks, or small black breed. During the last year or two, particular attention has been given to the large black breed, and many have prophesied that it will become as popular as the Yorkshires, but so far there is no evidence that the demand for this particular kind of pig has injured the breeding of the others. Of all these breeds, the principal ones are the middle-white Yorkshires and the Berkshires.

Referring more specifically to the starting of the bacon-curing industry on co-operative lines, Mr. Douglas said there would be no difficulty in sustaining the supply of raw material. This, however, altogether depended upon the farmers themselves, who, unless they recognised pig-breeding as a serious part of the economy of the farm, were not likely to contribute much to the development of the bacon-curing industry.

In Natal the development of this industry has been much hampered by the want of organisation on the part of the farmers. To keep a factory going, there must be an unfailing supply of pigs—a certain number monthly must be guaranteed, according to the capacity of the factory. To ensure such a regular supply, it is necessary for a number of farmers to organise and run a factory on *co-operative* lines, each member guaranteeing to supply to the factory a certain number of pigs monthly, under a heavy penalty for every animal below the prescribed number. He may, of course, supply as many more than that number as he likes. A note is kept of the number of pigs supplied by each member, and payment is made for the number in addition to a periodical distribution among the members, in proportion to the number of pigs supplied during that period, of the profits accruing from the sale of the bacon, etc. By this means, from the point of view of the society as a whole, the supplying of the minimum number of pigs required to keep the factory going at a profit, is ensured; and, from the point of

view of the individual members, there is at hand a ready market for all the pigs they like to produce, and there is the additional incentive of a profit on each pig, the breadth of which profit would probably increase in proportion to the number of pigs dealt with by the factory.

Denmark, with its pig and dairy industries, probably stands first as an example of what co-operation can do for a country. As Mr. Douglas points out, the success of the pig-breeding industry in the country is due principally to the fact that the Danish farmer has recognised the value of co-operation in nearly every department of his work. It is over a quarter of a century ago since the Danes realised that there was a market for bacon in England of which the British farmers refused to take advantage. They at once formed co-operative societies, the first of which was started in Horsens, and was a complete success. This society was quickly followed by the organisation of similar factories in various parts of the country, all, or nearly all, on co-operative lines. At the present day there are some thirty of these factories throughout Denmark; and when it is recognised that this small country is about the same size as the Province of Munster, in Ireland, and also that the food supplied for the pigs, such as rye and maize, have to be imported, the grit of the Danes and the value of their principles of working will be realised.

There is no need to comment upon feeding stuffs in a country like Natal; but the value of what might be termed thorough organisation in the pig-breeding industry cannot be too fully emphasised. The farmer's responsibility does not end with the fattening of the pigs, however scientific and up-to-date his principles may be. He must pay as much attention to the conditions attending the marketing of his animals as to feeding. Tying a pig's legs together and bundling him into a truck may be a very convenient method of marketing, but, apart from humanitarian considerations, it is not conducive to the attainment of the best results. As with the fruit industry, so with swine husbandry: large profits, and successful results generally, depend to a considerable extent upon the condition in which commodities are placed upon the market.

In the course of his address, Mr. Douglas described the form of a suitable bacon factory. An economical factory usually takes the form of a hollow square, and would rest preferably in one storey on a piece of ground about 200 feet square, covered with, say, five parallel roofs at an elevation of about 15 feet to the wall plate. The roofing could be of galvanised iron. The only really substantial parts of the buildings would require to be the cellars themselves and the engine-room.

The operations of such a factory are also described. The pigs are driven into pig styes, where they are rested. They are then driven one by one into a shackling pen, where they are hoisted to a bar, head downward, and they are at once despatched, and all the blood allowed to run

out. The carcasses are then rolled into a scalding tank, where they are allowed to remain until the hair can be easily removed. They are then rolled on to a scuttling table, where they are scraped, and immediately they are hoisted into a vertical singeing stack, where they are subjected for about a quarter of a minute to intense heat. This fire has the effect of hardening the rind, and also imparting a flavour to the meat. There are, of course, other methods of treating pigs for special purposes.

The principal feature of curing is the machinery. There must be a full complement of mechanical appliances, and the principal of these is the refrigerating machine, upon which the temperature in the chill room and cellars absolutely depends. A constant temperature is what is wanted, and constant curing conditions can only be obtained by the construction of suitable rooms, the atmosphere of which is under the control of mechanical refrigeration. The reason of this is that the public taste now-a-days is for mild cured meats, and it is quite impossible to cure meat in a mild way except in a constantly cooled atmosphere.

The mild cured meat may not always be acceptable, but it is certainly more nutritious than meat which is heavily salted, as, as has been already hinted, the heavier the salting and the longer meat remains in salt the less nutritious it becomes. This seems an additional reason why factories should succeed locally, as bacon which has to be sent on long voyages must be either heavily salted or packed in borax.

"I have said enough to show you," said Mr. Douglas, in concluding his address, "that there is an industry waiting to be developed at your doors here, and it would be a gratifying thing if you were to co-operate together and put down the first co-operative bacon factory in England."

In Natal we have made false starts in connection with co-operative bacon factories; but, under the conditions now prevailing, there seems no reason why one conveniently situated central factory worked on proper co-operative principles should not prove a great success.

The Marketing of Potatoes.

ALL the indications point to a phenomenal season in respect to at least two of the main crops of Natal—mealies and potatoes. Readers are aware of the steps which are being taken by the Minister of Agriculture to secure a market oversea for our surplus mealies. Unfortunately, however, precisely the same steps cannot be taken in regard to the thousands of muids of potatoes which farmers have on their hands. London market prices quite preclude all idea of finding an outlet for our

surplus potatoes in Britain; and in Natal there is no market for the surplus production.

A correspondent in the Marburg district writes that he has a crop of between 500 and 600 muids of potatoes of first-class quality, for which he can find no market. He has submitted samples to agents and produce merchants in Durban, and has advertised in the press for a fortnight, but all he has been able to dispose of is fourteen muids. "I know others," he says, "who have theirs rotting, and others who feed their pigs on them, because they cannot sell any, and the latter tell me that pigs are not particularly fond of potatoes."

Readers are invited to refer to the inquiries which the late Minister of Agriculture (Mr. Clayton) caused to be made during 1905 at all the various South African ports. Summaries of the replies that were received were published in the March, April, and June, 1905, issues of the *Journal*. From these replies it appeared that the average prices of imported potatoes at certain ports were:—

Delagoa Bay.—January to March, 18s. per bag of 160lbs.
Duty, 20 reis per Rilo. (1,000 reis equals 2s. 3d.; one Rilo equals 2 1-5th lbs.)

Mossel Bay.—January to April, 12s. 6d. per 100lbs. No duty.

East London.—Seed, for November to April sowing, 10s. per 100lbs. No duty.

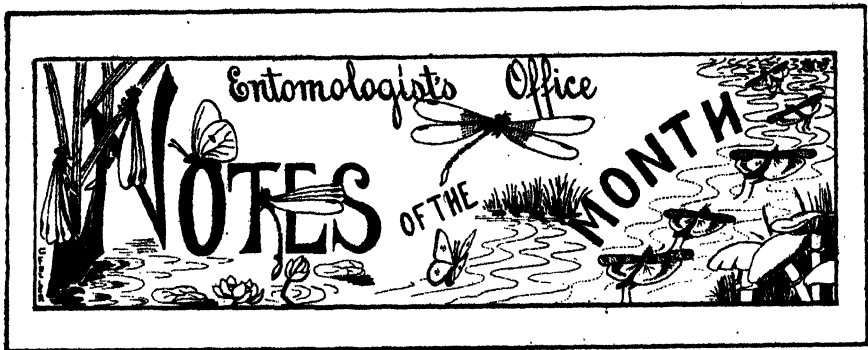
Port Elizabeth.—January to September, 10s. per 100lbs.; ordinary average price, 8s. per 100lbs. No duty.

A comparison of these prices with those ruling in Natal will show that, in some at any rate of the South African Coast ports, there is a profitable market open for Natal potatoes.

The freight for all produce (except forage and hay) for East London, Port Elizabeth, Mossel Bay, and Capetown is 15s. per short ton, or 40 cubic feet. These rates are nett, and include shipping and landing, except at Mossel Bay, when the landing is payable by the consignee.

If the potato-growers of this Colony were to form a co-operative potato-selling association and appoint someone whose sole duty it would be to keep himself informed of the probable crop for disposal and in touch with the markets in the neighbouring Colonies and at various ports of South Africa, large contracts could be entered into and every opportunity taken of fluctuations in market values in the various centres.

Some curious cases of animals having portions of their tongues bitten off have been recorded. In one case a pony had 3½ in. of its tongue bitten off presumably by a horse in the adjoining loose-box. In another the victim was an ox, which was trying to lick up a few oats from the manger of the horse in the next stall. The horse watched his opportunity, and bit off about 3 in. of the tongue. In a third case a horse bit off about 4 in. of the tongue of a cob stalled next to it, and presumably ate it, as no trace of the missing portion could be found.



Suggestions.

Winter Spraying.—Those parties who intend spraying their trees this winter, particularly pears for blight and peaches for peach freckle, should make arrangements to secure a proper spraying outfit in good time.

Pruning.—Arrangements should now be made to secure good pruning tools to do the winter work with; the decay and even death of many trees is due to careless pruning and the use of bad tools, which leave scars upon the trees through which fungus parasites gain an entrance and destroy the core of the tree.

Horse Bots.—From now on a good look out should be kept for the eggs of the Bot-fly. Prevention is better than cure, and by cutting off, singeing or greasing the hairs to which the eggs are attached at intervals of 7 to 10 days during the 6 or 8 weeks in which they are laid will not only prevent a gross infestation of the stomach by these creatures, but help to materially reduce the pest.

Arsenic.—Farmers requiring a supply of arsenic or arsenite of soda for the destruction of locusts next season should make an early application for the quantity they desire to this office. The material will be supplied at cost price.

Fruit Fly in Oranges.—All fallen citrus fruits should be carefully gathered and buried. This crop contributes more to the abundance of the fly in many neighbourhoods than any other factor. Those who are interested in the control of this pest are recommended to make an experimental trial of spraying with arsenate of lead and treacle, using 1 lb. of arsenate of lead, 5 gallons treacle to 25 gallons of water. The spray should be put on coarsely as it is only to act as a poison bait to destroy the adult flies which now abound amongst citrus trees.

LOCUST CAMPAIGN.

Early this month the locust campaign was brought to a close. Speaking from personal knowledge, the hatching this season has been the greatest since 1899. Hoppers hatched in great numbers practically throughout Zululand and the greater part of the Vryheid district as far as Paulpietersburg area. Natal was invaded further than formerly, Weenen, Pietermaritzburg (Ixopo), and Alfred Counties being more greatly infested than heretofore.

Owing to the small amount voted by Parliament it was impossible to cope with the invasion in any organised manner, but despite many drawbacks—the want of time, of money, and poison—a considerable amount of good work was done in many directions and numerous native crops saved from immediate destruction throughout the country.

This Colony is greatly indebted to its neighbours, the Transvaal and Orange River Colony, for the loan of poison. The former Colony supplied us with $\frac{3}{4}$ of a ton of arsenic and the latter with five tons of arsenite of soda. In all about 15 tons of poison was used or supplied to farmers by the Government. This amount, however, proved wholly inadequate. Ten tons were cabled for from England, but, owing to the difficulty of obtaining this, the bulk of that ordered did not come to hand in time; and, unfortunately, owing to an unexpected hatching of locusts in the O.R.C., of that which did arrive a return had to be made much earlier than anticipated. Had it been possible to retain this amount the work could have been carried to a finality in many parts where it had to be abandoned and left unfinished. The disbursements for the season already amount to £3,300 in excess of the sum originally voted.



LOCUST PARASITES.

According to some irresponsible writers this office is blamable for not giving more attention to the question of controlling locusts by means of the natural enemies of the pest, and is even unacquainted with such.

The parasites which have been observed preying upon locusts in Natal are: 1, A small wasp which develops in the egg—one egg accommodating a single parasite; 2, a tachinid fly, much like a house fly, the maggots of which live in the egg-pods and destroy most of the pod; 3, a beetle grub which burrows through the soil and destroys the eggs in the pod; 4, a hair-worm or nematode which lives in the body of the locust and destroys it; 5, a small red mite, a tick-like creature, which attaches itself to the flying locusts and considerably weakens its host when in any numbers; and lastly, the locust fungus.

It is not my intention to enter here into any dissertation upon the practicability of encouraging these parasites, because I do not see how

it could possibly be done, and I may say that their influence upon the host is infinitesimal. On occasions, however, large numbers of locusts or batches of eggs are destroyed by these natural checks, and it is such occurrences as these which give rise to hopes of better things, from such sources, in the minds of those who have not studied and can scarcely be expected to study the question in all its bearings.

The locust fungus has been well in evidence this season, but, speaking generally, its influence has been most disappointing. Never to my knowledge have we had so suitable a season, in respect both to meteorological conditions and abundance of locusts, for a general and natural outbreak of this disease.

To those who are unacquainted with the fact, I would remark that cases of locusts dying from natural infection have been continuously under notice. In November last winged locusts dead of fungus prior to egg-laying were abundant, and from all parts of the Colony I have reports of the presence of this parasite amongst the locusts. These facts show that the mould which infects the locusts is naturally widespread, and as it has not swept off the creatures we are now justified in placing small reliance upon its use. In short, we have found nothing equal to the arsenical poisoning of locusts, particularly after the hoppers are a fortnight old.



NURSERYMEN'S PERMITS.

Under the South African Plant Import Regulations governing the inter-colonial trade in nursery stock, permits have been issued to the following nurserymen to trade their stock in Natal. These permits hold good for the next 12 months, and are issued upon a confidential report of the state thereof furnished to this office:—

CAPE NURSERIES.

Pickstone Bros., Groot Drakenstein, general.
 Flanagan Bros., Komgha, general.
 Grace, J., Kingwilliamstown, general.
 Holder, J. S., Kimberley, general.
 Meyers, H., Paarl, general.
 Patzold, A., Tarkastad, general.
 Smith Bros., Uitenhage, general.
 Fraser, Modder River, general.
 Summerton, T., Alice, general.
 Vester, W. R., Paarl, general.
 Joubert, Wellington, general.

Cloete, H., Wynberg, vines only.

Lester & Jenkins, Constantia, vines only.

Murray, T., Constantia, vines only.

O.R.C.

Pickstone Bros., Platkop, Ficksburg, general.

CARNATION DISEASES.

Several parties have referred cases of carnation failures to me. Mr. Bell, of Krantzkop, furnished several specimens which I was able to examine; and, although a satisfactory conclusion was impossible, there was sufficient evidence to show that the plants had succumbed to the attack of a fungus parasite upon the root system. Whether this was the immediate and only cause I am unable to say. What seems most probable is that the plants were weakened by the presence of excessive moisture in the soil and consequent want of aeration. This condition is often sufficient of itself to destroy plants, and in any case renders them more easy victims to parasitic fungi or to the saphrophytic fungi living upon organic matter in the soil.

If it is not a question of drainage but of direct attack upon the roots by a fungus parasite, it is usually the best plan to remove and destroy garden plants before the soil becomes greatly invaded and many plants attacked, as many of the parasites are omnivorous in the matter of plants' roots. Valuable plants may be treated, and, whilst a cure cannot be guaranteed, success has attended the drenching of the soil with a solution of copper sulphate or bluestone prepared by dissolving this in the proportion of 3 lbs. to 10 gallons of water.



CATERPILLARS ON FIGS.

Specimens of looper and other caterpillars feeding upon the foliage of the edible fig were submitted by Mr. Spence, of Maritzburg. These soon after their receipt entered the pupa state, and adult moths have since emerged. The creatures have no popular name, but are known as *Trochila ficicola*, the moth being a night-flyer of a general reddish-brown colouration. This insect is not common, nor to be regarded as a general pest, although in this case it was somewhat destructive. Its abundance is controlled by wasp parasites, a number of which emerged from the caterpillars in question.

When the pest is sufficiently bad to call for treatment, spraying with arsenite of lead 1 lb. to 50 gallons, or Paris green 1 lb. to 100 gallons, of water will prove an effective remedy.

OAK CATERPILLARS.

The small green slug-like caterpillars, covered with rosettes of sharp spines—the puncture of which causes the painful sensation which has given these creatures the name of electric grubs—have been particularly abundant on oaks. Wattles and fruit trees have also suffered from their attack in certain parts. This is a native insect, and its abundance is usually controlled by parasites. Its treatment is similar to that recommended for the fig caterpillars.



MINA LOBATA BEETLES.

Mina lobata is a singularly handsome annual creeper of the convolvulus tribe—but differing greatly in the inflorescence—which is becoming very popular in Maritzburg. During the two previous seasons it remained immune to insect attack, but this year a native beetle has taken a fondness to it, as well as to the convolvulus vines which grow in weedy luxuriance in every vacant plot.

In one case the beetle is a nuisance, in the other it seems a pity that there are not more of them, for the convolvulus is a most troublesome weed.

To anyone at all interested in natural history, I would recommend this small creature to their notice. It is particularly fascinating, and the whole development may often be viewed if a few minutes are devoted to an infested vine.

The beetles are somewhat like small tortoises and ornamented with gilded patches. Their eggs are deposited upon the under-sides of the leaves, all together in a little brown-paper-like packet attached by a stalk to the leaf surface. It is the growth of the larvae from these which afford so much interest. All who have studied insects know that in the larva stage they moult their skins several times, as the snake sheds its skin. As a rule these moults are discarded or even eaten, but in these beetle grubs they remain attached to the tip of the abdomen, one surmounting the other in a most bizarre and fearsome form. More than this, the tip of the abdomen is articulated and the grub can lay the appendage down flat upon its back or erect it at will. The pupa or resting stage of the beetle will also be found attached to the leaves, and is no less grotesque in appearance than the grub.

Spraying with arsenite of lead and water has been found an effective remedy.

LUCERNE CATERPILLAR DISEASE.

During March Mr. Worthington reported that the lucerne caterpillars (*Cobas electra* and others unidentified) had died wholesale of an infectious disease due either to fungus or a bacterium. Whilst, from experience, there is little ground to hope that this may be made of some practical use, still it is a matter open for investigation, and where lucerne-growers notice flaccid and dead caterpillars hanging to plants they might with advantage collect them and after macerating them in 3 or 4 gallons of warm water, spread the disease further amongst the enemy by spraying over the affected areas of their fields.

PIGEON FLY.

This creature is one of the flying ticks, and has been reported to me from Ladysmith and Maritzburg. It is a biting fly related to the sheep spider and ostrich fly. It is remarkable because it produces its young* one at a time and in the pupa stage. In other words, the maggot lives within the body of the parent and is nourished upon the secretions thereof—as is also the case with the tsetse flies.

These creatures dart upon their hosts and enter the feathers with great rapidity and remarkable facility, and their long, spidery legs render them somewhat awesome in appearance.

***Organisation of the Tobacco Industry.*****ENTERPRISING VRYHEID FARMERS.**

LAST year Natal exported to other States of the Customs Union 1,301,314 lbs. of unmanufactured tobacco, valued at £19,304, of which 922,557 lbs., worth £14,774, were sent to the Transvaal.

It has for some time been a matter for comment that Natal should export so much of her raw tobacco to the Transvaal for treatment at the factories there. As far as can be seen, there is no reason whatever why a factory or factories should not be started in Natal for the treatment of tobacco grown in this Colony. It is true that we turn out a fair quantity of cigars, cigarettes, and pipe tobacco, as will be seen from the following figures, but this fact serves as an indication of the possibilities Natal has in the direction of the manufacture of tobacco, and furnishes additional reason why the unmanufactured tobacco that at present exported should not be treated locally:—

EXPORTS OF MANUFACTURED TOBACCO, 1906.

	To other States in Customs Union. £	To Transvaal. £
Cigars	12,318	8,848
Cigarettes	4,507	2,556
Manufactures, not other- wise described	5,630	2,738

Tobacco appears to grow well in nearly every part of the Colony. Some of the Coastal districts, and Weenen, Vryheid, Utrecht and Paulpietersburg are, however, the best known of the tobacco-producing districts.

Factories could very well be established, on co-operative lines, far enough inland to be away from the influence of the sea air. It needs only a few farmers interested in the industry to band together and form a co-operative society to set a factory going. Once there is a factory in operation, farmers will go in for tobacco cultivation much more largely than they do at present, as they will be assured of a ready market for the leaf. Under these circumstances, it is gratifying to note, in the *Vryheid Herald* of a recent date, that the farmers of Vryheid district are awaking to the possibilities that lay before them in the direction of tobacco culture. A preliminary informal meeting was held towards the end of March to discuss the best means of establishing and organising the tobacco industry in that district.

Mr. Fegg, M.L.A., who occupied the chair, first addressed the meeting. Such a factory as was proposed would undoubtedly be a very valuable asset not only to the district, but to the Colony in general, and its success, if conducted in a thoroughly practical manner—as it must be—was a certainty. All similar institutions, such as Van Erkom, Hartley & Co., etc., had originally started in a small way, and were at the present moment all well-to-do. The former, to his personal knowledge, commenced business with a couple of rolls which he cut up himself and hawked about; but by gradual degrees his business increased, until at the present moment he was worth at least £60,000, and owned one of the most flourishing businesses in the whole of South Africa.

Continuing, the speaker said that Vryheid possessed as good ground for tobacco as any part of the Transvaal. The benefits derivable would be appreciated not only by the farming and commercial communities, but by the consumers in general, as a constant supply of the very finest tobacco obtainable would be assured. Piet Retief tobacco was considered—and very rightly so—the best tobacco in South Africa, and as Vryheid possesses exactly the same soil and facilities for growing, no further argument in its favour should be necessary.

Mr. R. Levisohn next spoke. In the course of his remarks he said that his experience in tobacco growing had been considerable, and he could positively state that there was no risk attached to it. Another

thing in its favour was the insignificant amount of capital required. He had gone carefully into statistics (as far as they were obtainable) with regard to the local production, which for the last twelve months had been approximately 65,000 lbs., or otherwise an estimated annual turnover of £6,000. This was in tobacco alone. In addition, the consumption of snuff must be taken into consideration, representing a larger monetary value than many realised. This could be dealt with in conjunction with the tobacco; and the manufacture of cigars and cigarettes, which would undoubtedly represent an important item of revenue, could be included later on.

The Chairman wished to impress upon the meeting that the factory must be in a position to cure tobacco according to the growth and quality, and that the onus of choosing suitable leaf rested entirely with the factory. For that reason they must secure absolutely the very best quality obtainable and none other. And further, a thoroughly efficient man—also the best obtainable—must be engaged to buy and cure. As such efficiency can only be assured after years of practical experience and study, to know everything there is to be known in connection with this particular industry, the company must be prepared to pay a salary commensurate with such special knowledge. At present the farmers, after gathering the leaf, roll it up, and same in due time sweats and ultimately rots, which of necessity represents a dead loss somewhere.

He further said the whole movement must be co-operative, and the protection of the small man its chief study. And knowing the country as they all did, it would hardly be necessary for him to advise them to protect themselves to the extent of insuring their crops, which he understood it was possible to do.

At the conclusion of the proceedings a committee was elected, consisting of Messrs. Cheere Emmett, M.L.A., P. R. Fourie, and J. Rabinowitz, with Mr. R. Levisohn as secretary, *pro tem*.

If a society is formed on co-operative lines, there is every chance of success; and the concern will be a more profitable one to all the members than if a company or syndicate were formed in the ordinary way. Further and more representative meetings are to be held; and the course of this new venture will be followed with interest by tobacco-growers in other parts of the Colony.

An Italian horticultural journal has brought to the notice of the authorities at Kew a new fruit from Uruguay, identified as *Pouteria suavis*. It is about the size of an apricot, but of the shape of an apple; it is yellow and scarlet when mature, and possesses a perfume so delicate that it is equalled in no other fruit. The seed is like a large hazel nut, but the edible fleshy part of the fruit is small; it has, however, an extremely agreeable taste, and possesses such a remarkable digestive property that when the aborigines have over indulged, they eat freely of this before lying down at night, and then they sleep like a child and wake up the next morning with a clear head and a wonderful appetite.

Natal Agricultural Union.

ANNUAL CONFERENCE.

THE Annual Conference of the Natal Agricultural Union was held in the Supper Room of the Town Hall, Pietermaritzburg, on Wednesday and Thursday, the 10th and 11th of April. The Rev. Jas. Scott, President for the past year, presided. The following Associations were represented by the delegates indicated:—

Alexandra Agricultural Society: J. Kirkman, M.L.A., Hon. R. M. Archibald, M.L.A.

Alfred County Farmers' Association: A. G. Prentice and C. A. Holwell.

Acton Homes Farmers' Association: G. H. H. Coventry and J. W. Coventry.

Boston Farmers' Association: T. Thring.

Bergville Farmers' Association: G. L. Coventry and J. G. Fannin.

Camperdown Division Farmers' Association: J. Moon and W. E. Allsopp.

Donnybrook Farmers' Association: W. Hale Walton.

Durban and Coast Agricultural Society: E. W. Evans and T. Burman.

Dundee Agricultural Society: H. Wiltshire and W. Craig.

Durban Poultry Club: W. E. Allsopp.

Ginginhlovu Farmers' Association: H. H. Thole.

Gourton Farmers' Association: W. C. Stockil and M. Sandison.

Highflats Farmers' Club: L. H. Gray.

Hattingh Spruit Farmers' Association: D. Tandy and T. B. Smith.

Ixopo Agricultural Society: C. E. Hancock and J. Anderson.

Ixopo Farmers' Association: A. Keith.

Inanda Agricultural Society: T. Polkinghorne.

Ingogo Farmers' Association: A. Wood and E. W. Noyce.

Klip River Agricultural Society: J. T. Francis.

Lower Tugela Farmers' Association: A. E. Foss and Col. Friend Addison.

Little Tugela Farmers' Association: F. I. de Waal and F. G. King.

Lower Umzimkulu Farmers' Association: J. C. Aiken and C. H. Mitchell.

Mooi River Farmers' Association: R. Garland and H. Blake.

Mid-Illovo Farmers' Club: J. Ballam and B. B. Evans.

Malton Farmers' Association: R. W. Coffins and C. L. Lund.

New Hanover Agricultural Society: E. Peckham and Rev. J. Scott.

Newcastle Agricultural Society: F. A. R. Johnstone, M.L.A., and S. W. Reynolds.

Noodsberg Road Agricultural Society: H. Baynes and J. H. Hollings,
jun.

Nottingham Road Farmers' Association: J. King and B. Crompton.

Richmond Agricultural Society: J. Marwick.

Royal Natal Agricultural Society: D. C. Dick and O. Hosking.

Seven Oaks Farmers' Association: J. van Rooyen.

Slang River Farmers' Association: G. Kolbe and J. Uys.

Umvoti Agricultural Society: W. J. Newmarch and E. J. van Rooyen.

Umvoti Farmers' Association: P. R. Botha and W. J. Slatter.

Upper Biggarsberg Farmers' Association: G. Langley and W. L.
Oldacre.

Utrecht Farmers' Association: G. J. Shawe and D. Van der Spuy.

Vryheid Farmers' Association: T. W. Dukes and E. Northern.

Weenen Agricultural Society: R. H. Ralfe and J. H. Miller.

Ward I. Farmers' Association, Vryheid: A. von Levitzow and F.
Kolbe.

Zululand Agricultural Society: W. Saville.

Executive, not as delegate: T. G. Colenbrander.

A motion in favour of the reading of the minutes of the last Annual
Conference having been lost, the President delivered his address as
follows:—

"Gentlemen,—We have met once more to review the agricultural
doings of the past year, and to consult in respect to the future; to give
one another advice, and it may be comfort in regard to past failures—
such advice as may, I trust, turn past failures into future successes. The
past year has not, on the whole, been a very bright one for the agricul-
tural community in Natal: though I doubt if their position has been any
worse, if so bad, as that of our friends engaged in commerce. Generally,
crops reaped in 1906 were poor, drought in the early part of the year be-
ing the cause. The disturbed state of the country did not mend matters,
many farmers having to leave their proper sphere and exchange, I am
sorry to say, the plough for the sword and rifle. In our own sphere a
threatened enemy has got fairly into our midst. East Coast Fever has
now a very strong hold of our Colony. I may have something more to
say on this subject, but for the present will pass to more general matters.

"For some time a cry has been rising, and is accentuated by the bad
times we have been passing through, for a greater development of the
agricultural resources of Natal. No thoughtful man can do otherwise
than realise the need for agricultural advance in the Colony. From the
nature of the country that advance must be slow, and if attempts be
made to hurry it overmuch nothing but failure can result. A great
deal of rubbish has of late filled our newspapers in regard to closer settle-
ment. One writer who poses as an authority in a recent article says:
'We are told by every authority that our climate is one of the finest in
the world, our soil of the most fertile and responsive to be found any-
where, our rainfall adequate to all demands, our crude labour supply

ready to hand, our market at our doors, and yet we do not stir, we remain inert. Moreover, we find some miserable traducers who deny the above conditions.' Well, at the risk of being called a 'miserable traducer,' I, for one, most emphatically deny, and I feel sure that I will be supported by the majority of those who have any knowledge of the subject, that 'our soil' is 'of the most fertile.' In place of its being of the most fertile, I doubt whether 10 per cent. of Natal soil will, without a liberal treatment with manure, produce crops to pay for the labour expended upon it. Even in this season above an average I can take the writer to land which was well manured and well cultivated where the crop is not worth reaping. Our climate is a very pleasant one, but how about our farmers whose crops have been totally destroyed by hailstorms? Is our rainfall adequate to all demands? Probably it is at times more than adequate, when, as has happened on several occasions within the last three months, four or five inches of rain falls in a few hours, and acres of soil, with the crops standing on them, are carried completely away, and fences, which were supposed to be well above high-water mark, are found far away from their original position, a tangled mass of wire, standards, and straining poles. But is it adequate when we have months and months without a shower, as we had no further back than 1906, and in many other recent years? In such seasons seed time passes, the ground is too hard for any plough to touch it, while herds of cattle, reduced to skeletons, wander about over sunburnt pastures, seeking food which is not to be found. 'Crude labour supply ready to hand.' Is there a farmer in Natal who can depend on labour when he requires it, except those who have large tracts of land on which natives reside, and give labour for rent; or those who, as most of our progressive farmers do, employ imported labour from India? Why is this, if we have a supply of crude labour? 'Our market at our doors.' Where is this market, when, with the hope of having a few muids of mealies to spare, some of us will be asked to take steps to secure a market in London, which is scarcely at our door. How many other drawbacks has the farmer to contend against, many of which are unknown in other lands? Within the memory of some of us, how often have the cattle of Natal been swept off by lungsickness, foot and mouth disease, redwater, rinderpest, besides the annual losses by gallsickness, anthrax, etc., to say nothing of East Coast Fever, which is now doing its deadly work? How often does horsesickness sweep over the country? How often has drought destroyed promising crops, and how often have locusts left bare fields where flourishing crops were growing? The writer I have referred to waxes indignant that men of experience, with character, energy, and intelligence, are being driven out of the Colony through the doings of the Land Board. Now, does it not seem rather contradictory that the man who has enjoyed all the wonderful advantages described by this writer, and having energy, etc., etc., yet is obliged to leave the Colony unless he is taken by the hand and nursed on public funds?

"I believe this country may in time carry a much larger white population than at present, but this can only come about by degrees. To-day, to become a successful farmer in Natal, a man must either have a very considerable capital, as well as some experience of how to use it, or else he must be willing to fight the battle which the earlier settlers fought, to live, it may be, for years on what he can produce out of the soil, to work hard, and deny himself not only comforts, but even things considered necessities. Then in time he may work himself into an independent position. To-day there seems a desire to begin without capital, and yet to enjoy all the comforts and conveniences which others have acquired through years of hard toil. We find men who ought to know better urging the Government to give not only the land, but to support from public funds those who have no experience of farming, and who have been more or less failures in other lines of life. It may be perhaps necessary where large irrigation works are required, as at Winterton, for the Government to find the necessary capital. I very much doubt if the settlers there will be able to pay the very heavy rents required to meet the interest on the outlay. In time they may be able to do so, but it will only be by hard and steady labour.

"At our last general annual meeting it was resolved to hold a special meeting at an early date, to consider several resolutions relating to native affairs. The executive fixed this meeting for May 18th. When that day drew near the circumstances of the Colony were such that it would have been injudicious to hold a meeting, and probably, had a meeting been called, a quorum would not have been obtainable. As soon as circumstances permitted, a meeting was convened, and fairly well attended. One of the principal motions left over by the annual meeting for the special meeting to consider was that which asked the Government to appoint a commission to inquire into native affairs. When the Union assembled, on 10th October, a Commission had already been nominated. With such a Commission about to sit, it was not considered advisable to debate native matters very fully. A considerable amount of discussion took place on the personnel of the Commission, and a resolution was passed asking that the number of members be increased, and a list of names of those considered suitable by the Union for such addition was submitted. The reply will come before you, the result being that the Commission remains as originally gazetted. As this Commission has not yet reported to the Governor, it would be out of place in me to say anything of its work. I believe the report is expected in June.

"Let us now take a cursory glance at a few of our leading productions.

CATTLE.

"Putting on one side East Coast Fever, cattle have thriven fairly well during the past season. As usual there has been a considerable percentage of loss caused by the ordinary diseases known as gall, bush-sickness, etc. The winter of 1906 was severe, and cattle generally were

in low condition, but owing to the mild spring, so far as I am aware, there were not many heavy losses. Owing to the depreciation in cattle, from the inflated prices during war times, the profit and loss account of most herds of cattle show something on the wrong side of the ledger. This is not to be wondered at when we remember that the ox, which five years ago would have fetched £27, will scarcely bring £9 to-day.

DAIRY FARMING.

"Any traveller on the N.G.R. can see for himself that this is becoming an important industry in Natal. At present two (Nel's Rust and Mooi River) dairies seem to manage the major part of the work. There is, I understand, some talk of one or more new ones being started. Whether there is sufficient work for more I cannot say, but I very much doubt their being required at present.

"The introduction of cream separators has undoubtedly been of great advantage to Natal, and I trust that with the use of them the reproach of Natal rancids has gone never to return. A great deal has yet to be done before we have a really good Natal milk cow. Good milkers are to be found in most breeds, but I do not know of any one breed that can be said to be the breed for Natal. Every breed has some fault or defect. The Friesland or Holstein gives quantity, but very poor quality, of milk. The Channel Island may be said to be the perfect milk cow, giving both quantity and quality; but my experience is that the pure-bred animal is rather delicate, certainly it must have better treatment than a wet kraal to sleep in, and dry, harsh food to eat. My opinion is that we might have established an ideal milk cow for many parts of Natal, by a judicious crossing of the Channel Island and native cow. I would recommend a cross of Channel Island in all dairy herds, especially where butter-making is an object.

"From the public Press I see that under the pressure of retrenchment it has been thought necessary to do without our Dairy Expert. Whatever views we hold on retrenchment, I think that there will be but one feeling, and that one of regret that it should be necessary to do away with this department, which has done a great deal of good work during the term of its existence, and I am sure that all will sympathise very sincerely with the courteous and efficient officer who suffers under the scheme. (Applause.)

HORSES.

"Horses have commanded a fair price during the last year: their value was enhanced by the military requirements. During the last few years, probably owing to dry weather, horsesickness has not been very virulent. This year, I am sorry to say that it has been the cause of heavy losses to some of us; many valuable animals have been carried off by it. Inoculation of mules against horsesickness commenced in the Transvaal, and is now carried on by our own Veterinary Department. This promises to be a success; 1 per cent. is all that have been lost

from horsesickness amongst those treated. It is to be sincerely hoped that this inoculation will soon be extended to horses, and that our losses from this scourge will be greatly reduced. I think an impetus might be given to horse-breeding in Natal were our Agricultural Department to import a number of suitable entires; and either sell them by auction or arrange for them standing at convenient centres. The animals I would recommend are thoroughbreds of large girth, good bone, and not over fifteen hands. I understand such animals are to be had at a moderate figure. The importation of such animals might, I think, be done at little or no loss to the importers. In most parts of Natal the time has gone for large troops of horses; but if small farmers each kept one or two mares, which might be used for light work, our supply of horses might be increased with advantage to the farmers. One difficulty is the of suitable entires, which might be obviated as I have suggested.

SHEEP.

"Sheep have thriven during the last year, though some farmers suffered through want of grass in the early spring; others complain of the appearance of jackals, which do great damage amongst the lambs. Cape Colony farmers have suffered very severely from the ravages of these pests. I trust some means of keeping them out of Natal may be found. Wool has maintained a high price, and is still in good demand. The value of wool exported from Durban in 1904 was over £289,000, in 1905 £408,000, in 1906 £536,000. This is a satisfactory increase, but unfortunately there is no means of determining how much was produced in Natal, and how much was merely passed through. An attempt is being made, assisted by the Agricultural Department, to introduce Persian sheep for slaughter purposes. I hope it may be successful for the districts where Merino sheep will not thrive. It seems impossible to get the Persian woolled sheep. If such could be obtained, and would thrive in the warmer regions of this country, they would be a boon to Natal.

MEALIES.

"The crop of 1905-1906 of this grain was generally poor; in some districts very little was reaped owing to droughts during January and February. The thorn and semi-thorn country suffered severely; perhaps a three-quarter crop was reaped by Europeans and a quarter by natives. Prices have been fair, the deficiency being supplied by stocks remaining over from the preceding year. The mealie crop in Natal is always an uncertain quantity, some years a considerable overplus, others merely enough for our own wants, and sometimes not even that. The present crop promises to be a heavy one; I trust a record one. Already there has been a good deal of damage done by hailstorms and locusts; but I hope these losses will not seriously affect the year's crop. It is hoped a market will be found in London for the surplus crop, and arrangements have, I believe, been made for cheap railway and ocean carriage.

The expected surplus has been estimated at nearly 1,000,000 muids. I hope that estimate may be exceeded.

SUGAR.

"The sugar crop suffered in the same way as the mealie crop from drought in the beginning of the year. Growers complain of very poor prices owing to the enormous crop of cane sugar in Mauritius, and the same of beet in Europe. The crop this season promises well, and should no untoward event happen a large crop may be expected.

WATTLE BARK.

"For some years there had been a steady increase in the output of this commodity. In 1906 the dry weather hindered the stripping of the trees, and the export fell from £112,666, in 1905, to £89,056 in 1906. In the near future there should be a very considerable increase. The price for 1907 is about £1 per ton higher than in 1906, and the season, so far, is very favourable, so growers are contented and cheerful, or at any rate ought to be so. The extent of land thoroughly suitable for the growth of the wattle is, so far as I can learn, somewhat limited. On that account it has rapidly risen in value, some having changed hands at prices varying from £5 to even £10 per acre. The wattle grows very freely, and generally gets very little care, but I believe few trees or plants respond more quickly to careful cultivation. The growth of the wattle is now a well established industry, and in many cases a profitable one. The great drawback is the long time of waiting for returns. The grower must be prepared to wait at least six years. A considerable amount of silver, or blue wattle, bark has been put on the market this season, and has found purchasers at some £2 per ton below the molissima. What use it is put to I do not know, but trust it is sold under its own name and not as molissima.

COTTON.

"Many attempts have been made in the past to grow cotton in Natal. These have failed, and the following amongst other reasons may be given to account for that failure. Want of suitable and reliable labour. Ignorance in those who made the attempt, of the insect pests which attack the cotton, and the proper methods of treating these pests. Some of the difficulties have been dealt with, and another attempt to make cotton an export is being made by Mr. John Kirkman, M.L.A., near Umzinto. Last year Mr. Kirkman reaped at the rate of 600lbs. of ginned cotton to the acre (400lbs. is considered a good crop in America), which realised over 6d. per lb. in the English market. This year he and his neighbour have planted some one hundred and fifty acres, which last month appeared most promising. I lay on the table a sample of this year's growth taken from the gin by myself, on Mr. Kirkman's place last month. The climate of Natal is peculiarly suited to the growth of cotton, April and May, the two months when cotton ripens, usually be-

ing a dry time. There seems no reason why cotton might not be grown in the midlands, and perhaps even the uplands of Natal. The soil required is generally speaking similar to that required for mealies. Mr. Kirkman estimates the cultivation of a cotton crop as costing 25s. per acre more than that of mealies. I do not advise any one to try cotton without studying the subject thoroughly, and giving the crop their constant and careful attention; in fact, I think all careless or slovenly farmers will do well to leave it severely alone.

FIBRE INDUSTRY.

"A commencement with this industry has been made near Port Shepstone, and those connected with it are sanguine that it will prove a remunerative undertaking. The most promising plant seems to be the *Fourcroya*. This plant is cut down every eight months, giving a crop from 1 to 2½ tons per acre, which produces some 3 to 6 per cent. of fibre, worth from £38 to £40 per ton. Upon the cost of preparation depends the question of whether it will pay or not.

FRUIT INDUSTRY.

"The season generally has been favourable to this industry. In some parts of the Colony peaches were a failure, and the mango crop was small. Other varieties of fruit have been fair in quantity and quality. For first quality fruit there is generally a fair demand. I trust the South African Exhibition will be a good advertisement, and that a market may be found in Britain for some of our fruits.

LUCERNE.

"The growth of lucerne is increasing throughout the Colony, and I hear of wonderful crops being reaped on suitable ground. From experiments I have seen I am inclined to think that it may be grown on ground which has not hitherto been considered suitable. In a book on its growth the astounding statement is made that the roots have been traced down to a depth of 169 feet. Its great value as a food for most kinds of stock is well known.

PASPALUM.

"This grass seems to be making headway; large areas are being planted. Should it fulfil the expectations of some, it will revolutionise Natal farming. So far as my observation goes, I have great hope that it will be of great value to cattle owners in the districts where it grows well. It seems as if it would be suitable for making ensilage as well as hay and general pasture.

ENSILAGE.

"This valuable product is not used in Natal so much as it ought to be; our climate suits both its production and use. Heavy crops suitable for ensilage can generally be grown in the autumn, and we all know how necessary it is to have a succulent food for stock of all kinds in the dry months, from July to October. Many make-shift methods of mak-

ing ensilage have been tried, but so far as I have seen the only satisfactory plan of preparing it is to have a properly constructed silo built of concrete, or some such material. To save labour in getting it out, it is well to build this on the side of a hill, where, with the use of movable doors, it can be readily dropped into feeding troughs with the smallest expenditure of labour.

CHICORY.

"Amongst the minor industries which might be worth more attention than it has yet received is chicory. A Durban gentleman told me last week that he was ready to deal with one hundred tons years at about £17 per ton. Chicory requires light rich soil; the cultivation is somewhat similar to that of the turnip. Besides the marketable crop, there is a large quantity of green fodder which would be suitable for ensilage. The import into South Africa is of the yearly value of £13,000. To anyone seeking further information on this subject, I would refer them to the April number of the *Transvaal Agricultural Journal*. I lay on the table a few notes on the subject by the Durban gentleman already referred to.

EAST COAST FEVER.

"Since our last annual meeting this dreaded scourge has entered Natal (proper). Whether the late disturbances are wholly to blame or not I cannot say; but of this there can be no doubt, that the movement of cattle during the disturbances caused its rapid spread over a considerable portion of the Colony. The ignorance and incredulity of some people, who would not believe that it was anything but ordinary redwater or bushsickness, helped to spread the disease. The loss of whole herds of climatized Coast cattle was necessary to convince some that East Coast Fever was really in the Colony. From the notices on our agenda paper, a considerable portion of our time will probably be taken up in discussing what steps are necessary to hinder the spread of this disease. It may not, therefore, be out of place for me to make a few remarks on it. What I say is founded chiefly on material obtained from an address given by that able scientist Colonel Bruce, who has done so much in the way of investigating South African stock diseases. (Report of British Association, 1905, page 533.) Let us note some of the similarities and differences between East Coast Fever and Texan Fever or Redwater. These diseases are both caused by parasites, which enter the system of the animal attacked, multiply very rapidly, and destroy their victim. In East Coast Fever the parasite is called *Piroplasma Parvum*, in Texan Fever or Redwater *Piroplasma Bigeminum*. These parasites are both carried by the tick, East Coast Fever principally by the brown or tailed tick, *Rhipicephalus appendiculatus*. Redwater or Texan Fever by the common blue tick. One striking difference is that the East Coast Fever can only be carried by the very tick which has bitten a diseased animal, while Redwater is carried not by the tick

itself, but by the young or larvae of the tick which had adhered to an animal suffering from the disease. Another striking difference is that an animal which has recovered from Redwater has in its body the latent forms of the disease, and is thus able to perpetuate and disseminate the disease; while an animal which has recovered from East Coast Fever, though immuned, does not carry any germs, and is harmless in the way of spreading or continuing the disease. The knowledge of the fact that the very tick which bites the diseased animal is the only known method of propagating East Coast Fever is of the greatest importance in dealing with the disease. For when once the cattle suffering from the disease die out or are killed, there remains nothing more to be done than to destroy the infected ticks, and then we are clear of the disease. This, unfortunately, is not always easily done, as the tick can live for many months in the grass. It is now generally agreed that grass must be burnt twice before it is safe to turn cattle into what was infected veld. Thus, supposing the East Coast Fever be now under control, we must expect that eighteen months or thereabouts must elapse before it will be safe to take off restrictions in regard to the moving of cattle in Natal.

"I have just come from the district where East Coast Fever is rife, and what I have seen there makes me hope that we will give the matter most serious consideration before we recommend any relaxation of restrictions, however irksome these may be. (Applause.)

EXPERIMENTAL FARM.

"Since our last meeting Mr. Pearson has retired from his position as Director of Experimental Stations. Mr. Pearson was, I believe, a very hard working enthusiast; whether his style of working was not beyond our requirements or means is an open question. I trust his work will not be all lost to the Colony, and that we may yet reap some returns from his labour. Mr. Pearson has been succeeded by Mr. Sawyer, who comes with very good credentials from Rhodesia. Mr. Sawyer has favoured me with the following digest, which I trust will be of interest: 'The Agricultural College is regarded as the hub of our system and organisation directed to furthering the work of instruction. Numbers have doubled since November last, and we have now reached the present limit of our accommodation with 28 students in residence. Arrangements are being made for the reception of additional numbers. Lectures are given during two days in the week, and practical instruction on the remaining four days by the Farm Manager, Dairy Expert, Carpenter, Engineer, Farrier, Orchardist, and Forester. After an eighteen months' course in general agriculture, students may proceed for six months to either our Coast station or to the irrigation block at Weenen, choice being determined by the probable character of their future work. At Cedara an additional area of 280 acres is being brought under cultivation in the vleis by means of subsoil drains, part of which will be placed under irrigation for rice and winter cereals. Data will be secured as

to the costs and relative merits of different methods. of draining. Butchers' steers, sheep, pigs, and poultry are being introduced with a view to giving students instruction in the feeding and management of all classes of stock, and as the basis of a series of winter feeding experiments.

"Improvement of native veld and re-grassing with imported species is receiving attention. Plots have been extended to the scale of field crops for the purpose of checking earlier results and securing ample material for the selection, testing, and distribution of farm seeds. Attention is being given to the cost of raising forage and feeding crops, and their value in terms of meat, milk, and wool.

"At Weenen a fire-curing tobacco barn has been erected, and an experimental crop of cigar, cigarette, and pipe-leaf is now being cured. This building will now be available for the treatment of tobacco grown by the settlers.

"A small factory is being organised in the same connection. This station will be conducted as a model irrigation farm, in the hope of raising the general standard of cultivation in the district. At Winkel Spruit further land has been cleared to allow of the organisation of tea, coffee, cotton, and fibre plantations, all of which crops are now represented. A study of the deterioration of tea-lands and coffee disease is in hand, and 35 types of cotton have been placed in Liverpool for commercial valuation. New varieties of sugar-cane promise satisfactory results, and will before long be available for distribution. Ramie, sisal, and Mauritius hemp should yield valuable data in the future. Though many of the above-mentioned undertakings have yet to reach completion, we should welcome members of the Natal Agricultural Union at any or all of our stations.'

BACTERIOLOGIST'S STATEMENT.

"The following is what has been supplied me by our able Bacteriologist, Dr. Watkins-Pitchford:—

"I fear I am not in a position to make any very startling announcement with reference to my work in disease research. Such matters move slowly even under the most favourable conditions for progress, and in the past such optimum conditions have not existed except to a very limited degree. It is hardly more than a year ago that I was successful in getting a single veterinary to help me in a field of unlimited extent, and as you know one more than 'white to the harvest.' The work of the last year, however, has shown more advance in research work than ever before, and my oft represented postulate that the 'results of such work will be in direct proportion to the facilities given for the same seems to have at last fallen on good soil. In the present Minister of Agriculture I am getting a full measure of help and support, and the outcome will be, I am sure, a justification of the more enlightened policy. My serious efforts must, as I have told my Government, date from the beginning of

my opportunities in the year 1907. The work of calf disease is, I think, very hopeful, and I hope to be able to publish very shortly a report on this disease. I hope to do this within the next two or three months, but do not like to be too sanguine, as disappointments in such work are numerous. Horsesickness is also doing well, and definite progress has been made towards the production of a vaccine, but here again I look to the next year's work with its reasonable facilities as giving promise of a definite issue. The inquiry into blue-tongue in sheep is in much the same condition, so you see I am taking a much more hopeful view of the work of disease inquiry than I have ever felt justified in indulging in before. I feel that the consistent support and countenance given to the work by the Agricultural Union has been to a very great extent the factor which has caused a serious view to be taken of the importance of the work. The outlook is distinctly hopeful, and I think one would be justified in referring to it as such, and in advocating a continuance of the policy of encouragement which I fully believe the future will justify.'

STUD BOOK.

"Owing to the condition of the Treasury, it has been considered useless to make any attempt to get the necessary funds to enable Natal stock to be included in the South African Stud Book. I hope when better times return to the Colony that this will be seen to, and that Natal will unite with the other Colonies, and that there will be one Stud Book for South Africa.

INTER-COLONIAL AGRICULTURAL UNION.

"The second annual Congress of this Union was held in Capetown on the 30th and 31st May last. Natal was represented by Messrs. Alexander, Hancock, Craig, Holley, Moon, and Scott; other delegates were prevented from attending by the unsettled state of the Colony. His Excellency the Governor, Sir Walter Hely-Hutchinson, and the Mayor of Capetown, welcomed the delegates, and addressed the Union. The delegates were most hospitably entertained. The Minister of Agriculture and others organised several most enjoyable outings by rail, motor cars, and trams. On day was spent in visiting Darling where we saw a wheat producing country, the whole appearance of the soil being very different from anything to be seen in Natal. The next day we were taken to see the wine districts around Constantia. A copy of the proceedings lies upon the table. It will fall to you to elect delegates, and also to forward subjects to the next meeting, which is appointed to be held in Pretoria in August, 1907.

"I think we are all aware that this Agricultural Union has of late been the subject of a considerable amount of criticism. We have been accused of leaving our own field, and of having become too much a political organisation. Some maintain that the work we do is not to the advantage of the Colony, but merely for the aggrandisement of the farming community at the expense of the Colony. There may be some truth

in these things: for it is difficult sometimes to say where our legitimate sphere comes to an end, and perhaps occasionally members have gone dangerously near the border line. That the Union, as a Union, has erred seriously in this matter I am not prepared to admit. It is, however, wise for us to learn from our critics, and we should always remember that here we belong to no political party, that we are neither Liberals nor Conservatives, that we are neither Imperialists nor Little Englanders; in fact, we know no party. We meet here to further the interests of agriculture, and in so doing we are striving to make this land in which we dwell a more comfortable and happy home for civilised man. The man whom we delight to honour is the man who can show us how to make two blades of grass grow where one grew before. The man we welcome here is the man who can teach us how to grow an extra muid of mealies or potatoes from an acre, without greatly increasing the expenditure on that acre. The man we want to see amongst us is the man who can teach us how to grow our own wheat at a price to compete against the world. The man we want to see here is the man who can show us what breed of cattle, and by what feeding, we can produce the best milk cow or slaughter ox. The man we want amongst us is the man who can teach us what breed of sheep will thrive best, and produce the most and the best wool and mutton. The man we want here is the man who can teach us how best to cultivate the sugar cane or the black wattle, that they will give the best results for the labour bestowed upon them. The man we want is the man who will either bring us from over the ocean, or produce by his study and labour, the tree that will bear the best and most fruit. The man we want among us is the man who tells us what breed of fowls and what treatment of these fowls will give the best supply of eggs and the best table fowl. The man we want here is the man who will teach us how to dip or spray our cattle so that we may get rid of the tick at the least expense, and in the most humane manner; humane to the cattle, not to the tick. I might go on for a long time with a description of the men we want. I would repeat again that as an Agricultural Union we care not what party a man belongs to in politics; what we do want is that he seeks the advance of agriculture, and is willing to throw his quota into the common stock of knowledge which will lead on to development for the common good.

"In conclusion, I desire to give my best thanks to the members of the Executive for attendance at meetings of committee and general interest in the work of the Union. It is almost superfluous to say a word in regard to our secretary, Mr. Eadie. His devotion to the Union and the amount of work he does for it is far beyond any praise I can give. I trust he will long continue his valuable services, and give the same assistance to my successors that he has given to me." (Applause.)

Mr. King seconded the adoption of the report, which he said had been listened to with great interest.

Colonel Friend Addison, while generally approving of the President's

address, objected to the pessimistic note it contained. He objected in particular to that portion of the report which declared that Natal had all the stock diseases of the world, and that all but a small percentage of the land was bad. It was true they had rinderpest, lungsickness, redwater and gallsickness, but they knew how to treat these disease. East Coast Fever they had not yet overcome. They had cried "stinking fish" long enough. ("Hear, hear.")

Mr. John Kirkman, the Hon. R. M. Archibald, and others also spoke, echoing Colonel Addison's sentiments regarding the pessimistic tone of the address. Some discussion then took place as to whether the report should be "adopted" or "accepted"; and it was finally moved and agreed to that the meeting pass to the next business on the agenda paper.

EXECUTIVE COMMITTEE'S REPORT.

The Executive Committee's report for the year ending 31st December, 1906, as follows, was then adopted:—

"Strict economy has been necessary during the past year on account of the heavy drain on the funds during recent years. The Executive has not seen its way to recommend an increased subscription, and the only method of keeping within our means is to cut down expenditure. With this end in view the Committee recommend the annulment of the resolution requiring copies of the proceedings to be distributed to all members of Associations. It is considered sufficient that four copies should be sent to each Association.

"Three new Societies have applied for affiliation, which has been granted, viz.:—Charlestown Farmers' Association, Umvoti Farmers' Association, and Acton Homes Farmers' Association. Certain Societies, however, have not paid subscriptions for several years, and the Executive recommend that these Associations be notified of their arrears and be requested to inform the Secretary whether they desire to be continued on the roll of the Union. The Committee is aware that the times are not favourable for calling up arrears, but, on the other hand, the Union must have a sound financial position, and this is only attainable by erasing from the roll all Associations who are not likely to meet the charges against them.

"Financial.—The balance sheet shows a balance of £7 18s. 2d carried forward to 1907, but this was only possible by allowing certain charges to remain unpaid. These have now been met, and as will be seen from statement (B) Appendix III., after paying all charges and taking into account the subscriptions that had come in up till February 28th, the date to which the statement was made up, there was a surplus of £63 9s. 2d. to carry on the work of the year. Statement (C) is an estimate of income and expenditure for remainder of the year. This shows a credit balance of £11 8s. 2d. Of course it is assured that all Societies will pay their subscriptions, and it is anticipated that £10 10s. of arrears will be collected.

"Forestry.—The prizes offered by Mr. Maurice Evans, M.L.A., for forestry have only brought out one competitor. It now lies with the Union to place the results before Mr. Evans and obtain his views on the subject.

"Government Schemes.—The Minister of Railways and Harbours (Hon. C. Hitchins), and the Minister of Agriculture (Hon. W. A. Deane), wish the Union to appoint a time for hearing statements upon the export of mealies and the utilisation of the Government Cold Storage Works. If it is the pleasure of the Union the evening sitting of the first day of the Conference might be set apart for this purpose.

"The Committee have to thank the Mayor and Corporation of Maritzburg for their kindness in giving the use of the Supper Room of the Town Hall, free of charge, to the Union for its meetings. In connection with last meeting of the Union also the charge was remitted. This action on the part of the Corporation, combined with the sympathetic interest taken in the meetings of the Union by the Mayor and Councillors, will gain the hearty approval of the Union as a whole."

BURR WEED.

Mr. Mitchell, who formed one of a deputation which waited on the Minister on the subject, stated that the Minister had promised that no prosecutions would be instituted in connection with the Burr Weed Act until he had had an opportunity of introducing fresh legislation. Mr. Mitchell referred not to thistle but to the ordinary burr weed.

NORTHERN DISTRICTS SECESSION.

Mr. Van der Spuy (Utrecht Association) asked for leave to make an explanation of a personal nature. He made reference to a telegram which had been sent by the Utrecht and Dundee Associations to the Prime Minister of the Transvaal, expressing the desire of the people of Utrecht to come under the Transvaal Government. He said that the Association in question had no authority for the statement made regarding the feelings of the Utrecht people. It placed the Vryheid and Utrecht delegates in a false position. They wished to be distinctly understood that they were in no way responsible for the action of the secretaries of the Associations referred to.

LAND TAX.

It was moved that the following resolution should be once more placed before the Government:—"That, in the opinion of this Union, the time has arrived when a substantial tax should be imposed on all lands in the Colony not beneficially occupied,"

CALF DISEASES.

Mr. Alexander (Richmond Road Association) spoke very strongly on the subject, and urged that the necessity for moving in the matter of investigation be impressed upon the members of the Legislative As-

sembly. He read the following letter which he had received from the Government Bacteriologist:—

“In reply to your letter of the 5th inst. concerning the resolution passed at the last meeting relative to facilities for research into stock disease:—

“I have pleasure in stating that the Minister of my Department has recently made arrangements for the addition to my staff of another veterinary assistant, and has further sanctioned the provisional addition to the Estimates of a more adequate sum than has been available in past years for the carrying on of this important work. He has also expressed his intention of still further extending facilities as such need becomes obvious.

“As you are aware, we have been much behind other countries in the past in the provision we have made for carrying on the work of research.

“It must necessarily take some time before any increase of facility bears practical result, inasmuch as the work of investigation into disease-conditions is generally laborious and lengthy.

“I feel confident, however, that the near future will show the wisdom and advantage of the extended facilities which the Government is granting to promote so important a work.

“In regard to your query concerning the progress of the enquiry into Calf Disease and Horseshickness, I am able to inform you, as regards the former, considerable progress has been made, and that I hope to be in a position shortly to issue a report of the work undertaken in this direction, which I trust will prove of use in controlling this destructive disease.

“As regards Horseshickness—though not able to make an immediate pronouncement—I am sanguine that I shall very shortly be able to issue a report on the progress of this enquiry, and, I trust in this direction also, to make suggestions regarding the more efficient prevention of the disease.

“With regard to Blue-tongue in sheep, I hope to be able to issue a vaccine for its prevention in time for next season.

“All the above enquiries are of a hopeful nature, and I trust that, with my increased facilities, I may be able to push one or more branches of this work to a successful issue before another annual meeting of the Union, to which body I have reason to be grateful for past encouragement and support in the pursuit of enquiries often tedious and difficult.”

Mr. Alexander moved:—“That this Agricultural Union begs to urge on the Government the desirability of continuing to give the Bacteriologist the fullest facilities to carry out investigation in the cause and cure of stock diseases and fowl-sickness; and that every encouragement should be given him to try to discover a means of prevention, amelioration, or eradication of these diseases, and that it be an instruction to the

Executive Committee of this Union to continue to press the matter not only on the Government, but on the Legislative body of this Colony."

Mr. Deane (who, with various officers of the Department of Agriculture, was present), said that Mr. Pitchford had received the assistance he had spoken of, and that he was also going to receive the monetary assistance he asked. He added that the veterinary surgeons would in future be engaged in investigational work more, and not so much in doing ordinary stock inspectors' work.

Mr. Alexander's motion was put and carried.

MANGE IN HORSES.

A short discussion here took place on a question raised by Mr. Woods as to whether the replies furnished by Government to the resolutions of the last Conference were sent by the present or by the late Ministry, and whether, in the latter case, the present Government would adhere to any assurances given or statements made by their predecessors.

Mr. Deane reminded the meeting that the present Government had only been in office a short time, and could not be expected to endorse everything that had been said by the late Government.

The following resolution, relating to mange in horses, which had already been sent to the Government, then came before the meeting:—"That, in the opinion of this Union, the laws relating to Mange in Horses is quite inadequate to cope with the evil, therefore the Government be urged to bring in legislation with a view to having Mange in Horses brought under an Act, the same or as near as possible to the Scab Act." The reply of Government to this, in 1905, had been that a Bill on the subject had passed the Legislative Assembly, but had been thrown out by the Upper House.

Mr. Hancock moved that the words "the same or as near as possible to the Scab Act" be deleted and the following substituted: "to deal effectually with the disease."

During the course of the discussion which followed, it was stated by one speaker that the Police in his district had told him that they had no right to interfere with mangey horses on the road. Natives in the locations did not trouble to report mangey horses.

Mr. King was of opinion that the present Contagious Diseases Act was quite sufficient to meet their purpose. What was wanted was a more efficient system of inspection of horses.

Mr. Wiltshire said that power to compel quarantine and treatment was required. At present a native can keep mangey horses at his kraal.

Mr. Hancock's amendment to the original resolution was carried unanimously.

UNIFORM WEIGHTS AND MEASURES.

A considerable discussion took place with regard to the necessity for standardising weights and measures throughout South Africa. It was stated, in reply to a question, that, at the Inter-Colonial Conference,

resolutions had been passed that all grain should be sold by the hundred pounds.

It was pointed out that the Natal Government Railways were mulcted to a certain extent by the difference between the weights used in the Transvaal and those in vogue in Natal. •

Mr. Deane said that if the packages were all sacks the matter would be much simplified. He added that, under the Government mealie exportation scheme, the grain would be shipped in 200lb. bags—not 203lbs.

Mr. Mitchell pointed out that the Chambers of Commerce would only buy the 203lb. sack. He said farmers should combine and only sell at 200lbs. If they would determine not to sell save by the 200lb. bag, the Chambers of Commerce would be forced to yield. How the Government was going to help them in the matter, he failed to see. The remedy lay in their own hands.

Mr. Crompton moved, and it was carried, that the other Colonies of South Africa be consulted with a view to bringing about legislation for the standardising of South African weights and measures, the weights of sacks and packages to be left out of consideration.

TENANTS' COMPENSATION BILL.

It was agreed that the resolution on this subject be returned to Government, for the purpose of its being again brought before Parliament.

HORSESICKNESS.

The following resolution, which had been passed by the last Conference, now came before the meeting:—"That, in the opinion of this Union, the Natal Government should approach the Transvaal Government with a view to introducing the system for immunising horses and mules against Horsesickness." To this the Government had replied that it was still in communication with the Transvaal Government on the subject.

A request was made by Mr. Dick for the correspondence to be published, or that some information be furnished. Mr. Woollatt stated that, although they had been immunising mules in the Transvaal for about a year, the Transvaal Government was not prepared to issue the serum on a wholesale scale prior to September last. The Natal Government had not been disposed to inoculate mules for private individuals, for the reason that, if they had done so, it would have brought the system into disrepute. Many mules already had the disease, and if they died people would be inclined to blame the system of inoculation. They had immunised some 800 Government mules in Natal during last summer, and this winter they hoped to carry out immunisation on a large scale. In the Transvaal they had lost only 17 out of 5,000 mules, and in Natal, as far as they knew, the loss was three out of 800.

Mr. Deane said that Mr. Pitchford hoped this year to be able to issue a vaccine to immunise animals for one season if not for a longer period.

Mr. Alexander remarked that Dr. Theiler had told him it was possible to immunise a mule for one district, but that if it were moved to another district it might die of the disease.

Mr. Woollatt said the mortality this year from Horsesickness had been appalling. In the up-country districts and in the high veld, the mortality had been higher than in the low veld. In a season such as this, the present system has proved itself a success.

One of the delegates remarked that the practice of immunising mules had been going on for years; and stated that a preparation was placed on the market by the Cape Bacteriologist some years ago.

Mr. Woollatt replied that Dr. Edington's preparation had never been taken advantage of.

It was stated that Dr. Edington, who had been away from South Africa, had returned and had registered himself in the Transvaal as a medical practitioner. The preparation in question, it was averred, was recognised in the Cape Colony as a cure.

Mr. Dick's motion, "That this Government publish the correspondence with the Transvaal on the subject of Horsesickness," was carried.

THE POLICE FORCE.

Mr. Alexander moved:—"That this Union is of opinion that the Natal Police should be instructed in the native language, customs, and habits, and that facilities be given them to also acquire a knowledge of the Dutch language."

Mr. De Waal, in seconding the motion, said that if the men were given greater encouragement to learn the Dutch and native languages, they would become more efficient.

COLOURED RAILWAY PASSENGERS.

The Conference then proceeded to deal with the resolutions passed at a special general meeting of the Union held on the 10th October, 1906.

On the motion of Mr. Van Rooyen, it was agreed Government be asked to take steps to have certain compartments labelled, "For coloured passengers only."

LAAGERS.

In reply to a resolution urging the Government to take steps for the erection of laagers in certain parts of the Colony, Government had stated it was of opinion that temporary laagers of barbed wire erected as required were preferable as a rule to permanent laagers.

Mr. Van Rooyen considered that Government ought to reconsider the matter; and moved that the resolution be sent back to the Government.

The motion was carried.

LIFE MEMBERS OF THE UNION.

Mr. Mitchell moved:—"That the ex-Presidents of the Natal Agricultural Union shall be eligible to be elected by a two-thirds majority as life members, with power to take part in all meetings of the Union. Mr. Hosking seconded; and the motion was carried by 32 votes to 24."

CLOSER SETTLEMENT.

The Nottingham Road Farmers' Association moved:—"That this Union is surprised that the Closer Settlement Committee has not approached the Union to obtain the support or opinion of the farming community with regard to the all important question, and that two delegates from the committee be invited to attend the Union and discuss the question."

The Secretary read a letter from the Closer Settlement Association, in which it was suggested that three delegates might be received by the Union.

Mr. Alexander thought the time had arrived when this thing should be thrashed out with the Closer Settlement Committee, and the public be shown that the attitude of the farmers was not a selfish one, but that they wished to prevent harm being brought to the Colony by the rash schemes that were being propounded. He was of opinion that three delegates should be invited.

After some discussion, it was agreed to invite three delegates of the Closer Settlement Association.

DUTY AND RATES ON SEED.

The Newcastle Agricultural Society moved:—"That the duty on seeds of all descriptions should be remitted, and that the railway rates for transit on such seeds should be reduced to Colonial produce rates."

Mr. Johnstone, in moving this resolution, pointed out that the growing of potatoes in up-country districts was practically an impossibility at the present transit rates. He was of opinion that the duty should be removed from all stuff imported for seed purposes. The argument of the late Government against such a proceeding had been that some merchants used to import potatoes certified as for seed purposes and sell them for consumption as food. The matter would, of course, cause the Government some trouble, on account of its being one of the parties to the South African Customs Union. The potatoes in question were, nevertheless, only for use in Natal. As regards railway rates, the matter was solely in the hands of the Natal Government.

Mr. Wood supported the motion. With a Customs import duty of 2s. per pound on imported seed, potato-growers up-country were severely handicapped. Good seed potatoes were not obtainable in Natal. It was absolutely necessary, in the interests of the industry, to import seed every two or three years. Apart from this, the rail carriage on seed from Durban was enormous.

Other speakers opposed that part of the motion relative to the remission of the duty, on the grounds that it would not be conducive to the local production of seed potatoes. It was also contended that potatoes might be imported as for seed, and then sold for consumption. This, it was stated, was done by some merchants before the imposition of the duty.

Mr. Mitchell recommended a consideration of the question whether they could not produce their own seed potatoes by exchange. He suggested that they should enter into an agreement amongst themselves for this purpose.

Mr. Sawyer (Director of Experiment Stations) announced his intention of importing no more seed for planting at Cedara as he was arranging with the other Experiment Farms at Weenen and Winkel Spruit so as to grow their own seed. He also stated that he was putting 500 or 600 bags of potatoes in cold storage for experimental purposes, in order to determine times of keeping them in cold storage.

The motion was lost by 34 votes to 25.

NATIVES AND SQUATTING.

Mr. Kolbe, on behalf of the Slangrivier Boere Vereeniging, moved: "That, in the opinion of this Union, the time has come when the Government should cause a law to be passed forbidding owners, renters, or occupiers of any farm or farms from allowing natives or coloured persons to live upon their farms without a written contract."

Mr. Von Levetzow thought it was desirable to make a native liable to punishment for living on a private farm without having entered into a contract.

Mr. Kirkman was of opinion that all matters relating to natives should be left over until they had heard the results of the Native Affairs Commission.

It was pointed out that there was nothing to prevent a farmer from entering into any contract with his natives. On the other hand, it frequently happened that a native would prefer to go on to the next farm rather than enter into a contract.

Mr. Van der Spuy said there must be a law. It was necessary that all the farmers in a district should make a contract with his natives, so that natives could not desert.

Mr. Geo. Coventry was of opinion that every man should be compelled to adopt such a system. Further, they should not lose sight of the fact that Ordinance No. 2 of 1855 was still in existence. Had it been carried out from the commencement, the trouble that farmers had had with natives would never have existed.

Mr. King pointed out that a native could leave a farm at a week's notice, but that a farmer could not put a native off his land without six months' notice.

Mr. Archibald said that when they put rent against labour, trouble

would always arise. No matter what contract was made, natives would still break away and go where they could make better terms for their labour. He thought rent for the land their cattle fed upon should be charged, and wages paid out of it, which was the Coast custom. He did not see why the compulsory signing of contracts should be made universal, as there were districts where no trouble was experienced.

After some further discussion, the motion was carried by 29 votes to 19. A rider was added to the effect that the resolution be forwarded to the Native Affairs Commission.

TOBACCO FACTORIES.

Mr. Uys moved:—"That, in the opinion of this Union, the time has arrived when the Government should establish tobacco factories in the Colony."

He said factories were wanted in Natal. Tobacco would grow from the Northern Districts to the Coast. It was used for many purposes besides smoking.

Mr. Blaker thought it was too much to ask the Government to establish such factories, but they might ask for assistance in their establishment. He pointed out that the Government were experimenting at Weenen, and advocated waiting for the results of those experiments before moving in the matter.

It was pointed out by one delegate that it had been proved that tobacco would pay. There were several private enterprises that were now turning out tobacco successfully. He did not consider it right to ask Government to establish factories and compete with private concerns. The success of the industry was proved.

Mr. Kirkman was of opinion that all factories established should be aided by Government.

Mr. Sawyer (Director of Experiment Stations) explained that in Rhodesia, where he had been, they gave up growing inferior tobaccos for kafir snuff, dip and similar purposes. They also decided to concede an amount in weight in order to get the compensation of superior quality. Having a uniform system of cultivation, they proceeded to go in for a uniform leaf and a uniform system of handling. The assistance which the Government gave was in the direction of warehouses—not factories—in four different centres. They found it did not pay them to grow a poor leaf. For certain Turkish cigarette tobaccos they received as much as 2s. a pound. He had just returned from Weenen. Those irrigation settlements were particularly suitable for the cultivation of tobacco, which could be cured at one point. Green tobacco could not be transported more than ten miles. Splendid tobacco was being grown in Natal; but better seed, a better system of manuring and more suitable means of curing were required. He did not consider there was any need for factories yet.

Mr. Deane said no resolution was necessary asking for the estab-

lishment of tobacco factories. If the Colony could produce the tobacco on co-operative lines, they could count upon the assistance of the Government. That was the policy of the Government.

After a little further discussion, the following motion, which took the place of the original motion, was put to the vote:—"That the time has arrived when Government should assist the farmers of the Colony, either by establishing a tobacco factory or by subsidising any factories which may be established by private enterprise."

The motion was lost by 27 votes to 15.

EAST COAST FEVER.

Eight resolutions appeared on this section of the agenda paper under the heading of East Coast Fever.

A motion brought forward by the Seven Oaks Association was included in one from the Nottingham Road Association; and Mr. King, on behalf of the latter Association, moved:—"That, in the opinion of this Union, and in view of the presence of East Coast Fever in Natal, the Colony should be divided into districts. In each district there should be an advisory board appointed to advise and assist the Veterinary Department in devising the best means of suppressing the spread of the disease, and for the best means to be adopted for the local management of cattle in the various districts."

In explaining the reasons of his Association for bringing forward this motion, Mr. King said the management and details would be far better left to the local board, everything being referred to the Department for approval. The District Veterinary Surgeon would necessarily be one of the board; and with his advice the board would be of enormous assistance to the Department in Maritzburg.

Mr. Van Rooyen supported the motion. He considered the restrictions imposed would be carried out more strictly than they could be under the control of the Veterinary Department. The farmers were going to be the losers where there was to be any loss, and it was to their interests to act carefully.

Mr. Deane was of opinion that the motion was of no value. Apparently the members of the Northern Districts Association had not read the amending Act passed last session. In that Act the necessary provision was made. He pointed out that an Advisory Board could not be invested with executive powers. They could only advise the Minister of Agriculture. The advice given by the boards up to the present had in nearly every case been acted upon. Some members of the committees, the Minister continued, had not been quite discreet in issuing passes. An advisory committee was only an advisory committee. Who was to be responsible for their mistakes? The country would suffer. The country east of the main line of railway and south of the Cape-Natal line was already divided into districts, where advisory committees had been formed.

Mr. King pointed out that those boards were unsatisfactory, as they had no appointed times for meeting. He considered they should be put on a proper footing.

The motion was carried by 36 votes to 4.

The remainder of the resolutions regarding East Coast Fever were held over until after the hearing of the Minister for Railways and Harbours and Agriculture, on the subject of the export of mealies.

EXPORT OF MEALIES.

At the evening sitting (10th April) Mr. Hitchins (Minister for Railways and Harbours) and Mr. Deane (Minister of Agriculture) addressed the meeting with reference to arrangements the Government had made in regard to the export of mealies.

A special article on the subject appears in another portion of this issue.

CENTRAL MEALIE GROWERS' ASSOCIATION.

Mr. Alexander, on behalf of the Richmond Association, moved:—“That this meeting of the Agricultural Union considers that the time has now arrived to establish a Central Mealie Growers' Co-operative Union to deal with the staple crop of this Colony, and that a committee be formed from the delegates of this Union to draw up a practical scheme for the formation and working of such a Mealie Growers' Co-operative Union.”

He wished to thank the Government for the action they were taking in the matter of the export of mealies. He welcomed their proposals, as he believed they were going to do a great deal of good for the Colony. It gave him pleasure to say so, because he might later on require to criticise them. It was very desirable that a growers' association be established to go into all the details. The Government had gone a certain distance in making arrangements, but the remainder should be left to the farmers. All he asked was that the meeting should affirm the principle and form a committee to undertake the work, to include ten or twelve, with the new President of the Conference to take the chair.

Mr. Hancock hoped the resolution would not be passed. The Government, having commenced, should be allowed to carry the matter through to its completion. He considered it would hamper the Government to in any way interfere with the scheme, which was a very feasible one, and from which the farmers would reap much benefit.

Mr. Van Rooyen considered the motion was a step in the right direction. Government would be sure of good mealies, as the proposed Union would take care not to accept mealies that were not fit for exportation.

Other delegates spoke, some in favour of and others against the idea.

The Minister for Agriculture, on being appealed to, said the Government would welcome a union of the nature suggested by Mr. Alexander.

Mr. Alexander said that the idea was that the union should take over the export of mealies to England and elsewhere. He wanted a growers' union, to work with the Government. It would enable them to work out the details, and to tender for large supplies, which they could not do as private individuals. The union would charge a small commission on the mealies exported, and would otherwise be conducted on thorough business-like lines.

The motion was carried by 49 votes to 4.

CENTRAL FRUIT GROWERS' UNION.

Mr. Alexander moved:—"That this meeting of the Agricultural Union considers that the time has now arrived to form a Central Fruit Growers' Co-operative Union to advance the export of fruit from this Colony, and that a committee be appointed from the delegates of this meeting of the Union to draw up a practical scheme for the formation and working of such Central Fruit Growers' Co-operative Union."

The same arguments, he said, applied to the formation of a fruit-growers' union as to the mealie-growers' union. There was on the Coast a fruit-growers' association, but he did not see any reason why the two should clash. If fruit was to be exported from up-country, it was very desirable that they should have an association more in touch with up-country growers than the Coast association could be.

The motion was seconded, and carried unanimously.

EAST COAST FEVER: COMPENSATION.

Mr. Van der Spuy moved, on behalf of the Utrecht Farmers' Association:—"That, in the opinion of this Union, farmers residing in districts infected by the East Coast Fever, and suffering under and by reason of restrictions laid down by the Government, should receive more substantial assistance from the Government."

He argued that, if there should be any loss, no one district should suffer more than another. The loss should be sustained by Government, and so by the whole Colony.

In connection with this matter, Mr. Thole brought up the question of fencing material and mules. He said an applicant for Government assistance in that form had to make oath that he could not get anyone to lend him the money he required. A farmer, he said, could always get *someone* to furnish the money, and so he could not make oath without committing perjury. He considered that Government was giving no assistance to the farmer, and he would therefore support the motion before the meeting.

Mr. Johnstone sympathised with the mover of the resolution. He illustrated what was done by the Government for the farmers when Rinderpest broke out in 1896. Oxen were lent. All the farmers borrowing had to take oath that those oxen would be returned after two or three years, when called for. Most of the borrowers purchased those oxen. Why could not that be done now? Let them lend these men:

the animals to do the work, and at the end of a certain time let those animals be returned.

Mr. Deane said Mr. Johnstone had explained what the Government had done in the Rinderpest days. The present Government was doing exactly the same thing. Government was empowered by the Act to spend £100,000 in assisting poor farmers. Some 1,500 mules had been purchased, and many of these had been allotted. Government had to pay £22 10s. for the mules. Immunising them cost £1 a dose; and a certain number had died.

Mr. Woollatt (Principal Veterinary Surgeon) next spoke. He said that every mule was tested, and he was satisfied that it was free from Glanders. In Vryheid district the farmers would have mules that were not immunised. He made a practice now of not issuing any mules that had not been immunised. He expressed his willingness to replace any mule dying after it had left his hands, providing it could be proved that the infection took place before the animal was issued.

After some further discussion, the mover (Mr. Van der Spuy), upon being called on to reply, said that since the Rinderpest days of 1896, the people in his district had had hardship after hardship. Repatriation cattle had been bought, and were not yet paid for, and those cattle were now lost. The Minister of Agriculture said they must buy mules at £25. If a man bought eight mules, for example, there was another £200, and so the debt grew. If there must be a loser, let the Government be that loser—not the individual people. The Minister had said they were not thankful; they *were* thankful for everything the Government had done.

The motion, on being put to the vote, was carried by 19 votes to 12.

E.C. FEVER: STAMPING OUT.

The Hatting Spruit Association moved:—"That, in the opinion of the Union, that should any herd of cattle become infected with Tick Fever, it should be made compulsory for the owner to sell same for slaughter purposes, if he cannot supply sufficient clean veld for temperature camps, and sufficient clean veld for grazing purposes, after having passed through the temperature camps, the Government to fix schedule price and take over such cattle, and that all infected areas be fenced."

At the present time, it was explained, the Veterinary Department had not the power to deal with infected herds that it ought to have. As long as cattle were kept on private land, they could not be touched under the Contagious Diseases Act.

Mr. Tandy thought it would be a good plan for three or four owners of contagious farms to pool their cattle or pool the risk of sickness. These farms could then be treated as one farm; and in that way the small owner would not be at any greater disadvantage than the large owner. For instance, if the disease broke out on one farm, the cattle

not infected could be removed to whichever of the neighbouring farms was clean. Another point was that, under the latter portion of the motion, the Government could fix a schedule price and take over the cattle.

In a discussion regarding the position of the native in the matter, Mr. Jas. King said that, so far as the locations were concerned, they should be fenced in; then, if the cattle wished to die, let them die. But the native residing on private land should be dealt with in precisely the same way as the white farmer himself.

Mr. Deane explained that the powers asked for by the resolution were asked for by the Government during the last session of Parliament. The only way was to remove cattle from the land. He stated that the whole of the native locations were now fenced; and he pointed out that Europeans and natives were both selling cattle to the contractors' buyers.

The motion was carried by 40 votes to 5.

E.C. FEVER: FENCING.

The Hatting Spruit Association brought forward the following motion:—"That it is the opinion of this Union all native locations should be fenced, and that the funds of the Natal Native Trust be used for this purpose. That all farms should be fenced in, and owners to be given a specified time to do it, failing which, the Government should have the right to fence and charge to the owner or owners."

Mr. Tandy said the first portion of the resolution had been disposed of by Mr. Deane's statement that locations were being fenced. With reference to the second portion, he said fencing was necessary, as many herds in a district got mixed through the carelessness of the herd boys.

After a short discussion, the motion was put to the vote and carried by 19 to 10.

This terminated the first day's proceedings. A report of the second day's proceedings will be published in the next issue of the *Journal*.

(To be continued.)

Of all the nations of the earth, Americans are said to consume the greatest amount per head of sugar and its by-products.

The idea that docking a horse's tail strengthens his back is a very old one. Gervaise Markham, the great authority on horses 250 years ago, says: "The curtailment of horses is used in no nation whatsoever so much as in this kingdom of ours, by reason of much carriage and the heavy burdens which our horses continually are exercised and employed; withal and the rather since we are strongly opinionated that the taking away of these joints doth make the horse's chine or back a great deal stronger and more able to support a burden, as in truth it doth; and we daily find it so by continual experience."

Experiment Farms.

CEDARA.

TO DIRECTOR EXPERIMENT STATIONS.—

Since submitting my last report, a continuation of the wet weather then prevailing has predominated, and the total rainfall from 1st July, 1906, to 31st March, 1907, has now exceeded 35 inches, as compared with the corresponding period of last year, when 24 inches was recorded.

The rainfall for the month has been 4.86 inches, and the maximum and minimum thermometer readings have been respectively 90 degs. and 49 degs.

A very sharp and severe hailstorm (but fortunately of short duration) was experienced on the afternoon of the 28th ult. Very little damage was done to the crops beyond the leaves being somewhat torn and shredded. Considerable damage, however, was done to the buildings, the College suffering most, having many panes of glass broken. On the 30th ult. another storm passed over, which was of longer duration but not so destructive. No damage was done.

The work of harvesting the various crops has been considerably hampered owing to the incessant rain, which has necessitated the removal of the men to other work continuously, it being impossible to continue harvesting the crops in the rain or while they were still wet.

The following crops were harvested during the month:—

1. *Soy Beans for Fodder*, which were planted in the "Distance of Planting" Maize Section, show corresponding section averages, in the case of Sections X and Y, while the average for Section Z is a trifle over 50 per cent. better, as the result of subsoiling.

The alternate rows, which were left to mature grain, will be harvested during the current month, when the report thereon will be submitted.

2. *Potatoes: Distance of Planting Section*.—The results of this experiment are extremely interesting as well as encouraging. The sets used in this experiment were $\frac{3}{4}$ oz., $1\frac{1}{4}$ oz., $1\frac{3}{4}$ oz., and $2\frac{1}{4}$ ozs., planted in drills 2 feet 8 inches apart, and planted at distances of 9 inches, 12 inches and 18 inches in the respective plots, each section being planted with alternate dressing of light and heavy manuring, the light dressing consisting of 170 lbs. Sulph. Ammonia, 300 lbs. H.G. Super., and 100 lbs. Muriate of Potash per acre, the cost of which was £2 11s. 4d., and the heavy dressing being double this amount. The results vary from 12,240 lbs. per acre to 24,200 lbs. per acre.

There has been a steady increase in the results of this section since its first cultivation three years ago, which increase is due to the repeated dressings which have been applied from year to year in the same proportion.

The variety grown was "Up-to-date."

3. *Potatoes in Manures Section*.—This comprised the results of various treatments of what are termed the Superphosphate and Slag Sections, Sulphate of Ammonia being applied with Super. and Nitrate of Soda with Slag. The result was in favour of the latter, which gave an aggregate of 7,125½ lbs. to the section, while the former gave as a result 7,065¼ lbs.

The highest yield on the Slag Section was from a dressing of complete manure, viz., 448 lbs. Nitrate of Soda, 600 lbs. Slag, and 300 lbs. Muriate of Potash per acre, 13,230 lbs. per acre being obtained.

4. *Millet Manure Section*.—On the Millet Section the highest yield was obtained from the plot receiving a dressing of complete manure, viz., 170 lbs. Sulph. Ammonia, 200 lbs. Superphosphate, and 80 lbs. Muriate of Potash. The area was 1-20th of an acre, and produced 1,077 lbs., being at the rate of 10¾ tons per acre. Variety, *Fruentaceum giganteum*.

5. *Manure Section of Rye*.—The medium dressing of complete manure again produced heaviest yield of dry forage; over 2½ tons per acre.

6. *Manure Section of Oats*.—A heavy dressing of complete manure on this section produced at the rate of 5 tons 1,740 lbs. per acre of Algerian oats, while a similar section planted with Indian oats produced only half that weight of dry forage.

No increased yield was given on the Cultivation Section from sub-soiling; in view of the thin nature of this particular piece of land (iron-stone) the result was as expected.

The following crops have been planted, in connection with which the necessary ploughing and preparation of the land has been attended to:—Turnips, rape, buckwheat, lupines, barley, soy beans, rye, prickly comfrey, oats, tares, mustard.

Hay-cutting has received special attention on every occasion when the weather would admit; and, although the hay has been carefully stacked in small ricks on the ground, it is feared a good deal of it has been badly spoiled.

The Stockman reports:—

Horses: The same as last month, viz., 9, with an additional 5 still on loan from the Militia Department.

Mules: Five. One died of horsesickness.

Oxen: Same as last month, viz., 38.

Sheep: One ewe has been sent to the Bacteriologist, Allerton; one has died of snake bite; and a ram got severely worried by dogs and died from injuries received. Five lambs have been born. The total number of sheep at the end of the month was 2 rams, 39 ewes, and 7 lambs.

All the sheep were hand-washed with Cooper's dip on the 7th. Fifteen ewes have been drawn off the pure bred flock for extra feeding, the ration consisting of ½ lb. oats, 1-3rd lb. soy beans, 1 lb. maize silage,

and 1 lb. oat straw each daily. Fourteen pure bred ewes have been turned in with the graded flock, but are getting no extra feeding.

One ram (getting a daily ration of 1 lb. crushed mealies, $\frac{1}{2}$ lb. soy beans, 1 lb. maize silage, and 1 lb. oat straw) is put to each flock on alternate days. The ram was put to the "No Ration" flock on the 26th. Eleven ewes have been mated, and 12 in the "Rations" flock.

Four students were working with the Stockman during the month, particularly at hay-making, and he reports that they are good workers, diligent and attentive.

The Blacksmith has been mainly occupied in overhauling implements and machinery, also attending to incidental repairs, etc.; and the Carpenter has been constructing fowl-houses and fences. Both tradesmen report progress on the work done by the students under their tuition during the month.

I have to report favourably on the progress made by students engaged on field work during the month.

Eight farmers' associations, comprising a total number of 200 members, have visited the Farm during the month.

On the 26th the Field Experimenter, Mr. Hosking, left to take over the duties of Curator at the Weenen Experiment Station.

ALEXANDER REID,
Farm Manager.

HOUSE MASTER'S REPORT FOR MONTH OF MARCH, 1907.

TO DIRECTOR EXPERIMENT STATIONS.—

The past month has continued to show a steady increase in the number of students at Cedara, the number in residence being now 27, with one more entered to come during the middle of this month. This practically reaches the limit of our accommodation, though means have been devised whereby we shall not have to refuse students should any more apply for admission. The number of visitors to the farm for last month also approaches a record: between 230 and 250 visitors having been entertained at the school. This has of necessity thrown an immense amount of extra work upon the Matron, and great credit is due to her for the excellent manner in which these large lunch and breakfast parties have been catered for. The school having now been in existence for a year, and several students having now completed the short, one year's, course, I think it would be an excellent plan if you could in some way let the farmers of the Colony know that we shall from time to time be turning out young men from this school who will be seeking for situations on farms. Of course many students on leaving this school will go straight on to their fathers' farms or start on their own account; but there will be others who, for various reasons, will prefer to seek situations either as assistants or managers. I would propose that some careful system of testimonials be adopted whereby we

should tell any farmer, who thought of giving employment to any of our students, exactly the capacity of such student in each branch. Thus, after a time, we might find that farmers would be glad to take young men on as assistants who had been trained here, as they would know what they might be able to expect them to know in each branch. In fact, I would suggest that a sort of Labour Bureau might be started here, by which any student who wanted a situation after leaving here might register his name with you, together with the date at which he intended to leave; and by which any farmer who required any white assistant might write to you stating all particulars of what he required. I think if some system of this sort could be started, it would prove of benefit both to many of the students here and to farmers in want of assistants.

C. W. HANNAH, M.A.,
House Master.

WINKEL SPRUIT.

TO DIRECTOR EXPERIMENT STATIONS.—

With the exception of coffee stumps which were planted early in the month, no other sections have been planted.

The work has consisted chiefly of replanting chicory section, filling in blanks on aloe section, and transplanting celery, ramie, and tea plants from seed beds. All the weeding is well in hand, and we are now busy erecting a large crib for the storage of maize cobs.

The monkeys are causing us a lot of trouble, their depredations amongst the maize crops necessitating the constant time of two Indians, one to each of the large sections, who are on the watch from daylight to dark. Sundays included. We have shot a number of them, but there are still hundreds prowling about the bush.

Mostly all the crops are looking well, in fact the only exception being the Lima Beans, which are covered by rust. The flying weevil is very conspicuous this season, and is doing a great deal of damage to the ends of the maize cobs, especially those which are inclined to open at the top. In selecting seed for next season's planting, it will be advisable to carefully select from the cobs that are well covered by the husk, as the weevil and other pests do not trouble them so much as those that are open.

The peanut foliage is covered by black spots, but this does not appear to effect the nut, as the crop now growing is the best ever grown on this Farm.

The cowpeas are making fair headway, but unfortunately there are a number of blanks in the rows owing to some of the seed not germinating and my not having any seed left to replant with.

Land has been prepared for planting potatoes, and we are now awaiting seed, which should be here in the course of a few days. Experiments

carried on for the past two years in Times of Planting Potatoes (viz., every 15 days), tend to prove that March and August are the two best months in which to plant on the Coast. This does not mean that we get a heavier yield, but we get a far superior eating potato. September, October and November plantings have given heavier yields than any of the other months, but the tuber is usually covered by watery nodules causing early decomposition and leaving a dark spot on the potato when cooked. Careful investigations prove that these nodules are caused by excessive moisture in the soil, more especially on loose sandy soil, where the sun has a powerful effect, forcing the young tubers to absorb more moisture than it requires, creating diffusion and to a great extent weakening the starch contents. If late March or early April plantings are fortunate enough to get a steady rain, or enough to help the young shoots through the soil, we can be certain of reaping a fair crop of splendid eating potatoes.

The eleven Inanda varieties of cane which were shown by illustration in last month's *Agricultural Journal* (although planted late in the season) are making good growth, and should produce sufficient cuttings to plant about four acres this coming season.

Horsesickness has been very prevalent on the Coast this year, and we were unfortunate in losing a reliable animal only purchased a month before.

W. JOHANSEN, Manager.

Agricultural Organisation in Natal.

MEALIE EXPORT.

THE spirit of progress in co-operation is exemplified by the project brought forward by the Richmond Road Association, and carried as a resolution at the recent Conference of the Natal Agricultural Union, for the formation of a central mealie growers' union.

This step may be taken as some indication that the efforts of the Government to build up an oversea trade in the products of the Colony are meeting with some response in the shape of the co-operation of the farming community. Soon after the present Ministry took office, it was brought to their notice that there would be a surplus of some 500,000 muids of mealies over and above the requirements of the Colony this season; and Ministers decided to consider the question of turning this surplus into actual cash. It was felt that the freights and railway rates were high, and that the first thing to do was to see what the steamship companies were prepared to do to help the mealie-grower in regard to rates. At the Natal Agricultural Union Mr. Hitchins stated that

rates had been secured from Durban to London at 15s. per ton. There would be a small charge made in London for the sale of mealies, commissions, and other expenses, which would amount to sevenpence a muid. A rebate of 3d. would be allowed on each new sack, reducing these charges to 4d. a muid. He also stated that the Government, in consultation with the General Manager of Railways, had decided to reduce the railage on mealies to a half-penny per ton per mile, with a minimum of 5s. Mr. Hitchins also referred to the question of the shipment of mealies at the Point. The Government would place a man there for the protection of growers. His duty it would be to test every consignment of mealies. Mealies must be clean and properly dried. The bags must be new and well sewn, and he knew that from his 30 years' experience at the Port. If the Government reduced the railage to the almost unpaying rate that they had decided on doing, the Government would ask the farmers to send nothing but the best article for shipment to England; and the Government would see that the principle was carried out. For instance, if 500 bags, marked "B," were sent to the Point, and the first bag examined did not come up to the mark, the sender would be advised that they were there at his own risk and expense. It had been bruited about, Mr. Hitchins went on to say, that the Government were buying up mealies for shipment. This was not the case. The Government were endeavouring to assist the mealie-growers to export this valuable product; and they wanted to see mealies shipped from Natal in quantities similar to those shipped from South America. The freight was lower than for South American mealies at the present moment, and it had been brought as low as or even lower than that of any Colony he knew of. A Durban gentleman was prepared to give seven shillings a muid at the Point for mealies if they were able to pass the Government agent. The price of mealies in London was a little over ten shillings a muid. He hoped that mealies from the middle part of the country would not run the farmer into an expense of over 2s. 3d. a muid. He had endeavoured to obtain the fullest particulars as regards the mealie market in London; and his advices showed that the Natal mealie would fetch 3s. 6d. a quarter more than the South American mealie, which was the prevailing product consumed in London. He hoped the farmers would assist the Government as regards the details required for this shipment. Then, he believed, it would be a very valuable asset, and not, as it had always been considered by some people, "the miserable mealie."

Mr. Deane (Minister of Agriculture), who also spoke, said that the shipment of mealies would be under the administration of the Department of Agriculture. During the months of June and July, the intention was to collect samples of white and yellow mealies throughout the Colony. Out of that mixture they would draw three samples, which would be forwarded to London, Liverpool and Hamburg. Buyers, of course, would rely on stocks being up to the samples. The advantage of selling on sample was that before the mealies left the Point the con-

signor knew what they were going to realise. The Government intended giving every facility for storing these mealies at the railway sheds and at the Point. In the past it had been the custom to keep on importing things into the Colony, but they now realised that this was not conducive to the Colony going ahead. The Government now resolved to change things about and export products from the country. The fruit industry was being assisted in like manner. They wished to see every industry which depended on the soil develop; and they recognised that if they would develop the country it must be on the lines they were now going upon. In regard to amounts realised on the sale of mealies in London, Mr. Hitchins stated that such monies would be banked by the Agent-General and cabled to any bank in this country without any exchange anywhere. He took the opportunity of thanking the Natal Bank for the great facilities they had afforded the Government and farmers in this matter.

The Government has thus done good work in preparing the way for combined effort on the part of the farmers themselves, and, as has been evinced by the resolution passed at the Conference, the farmers have not been slow in taking advantage of the opportunity. In bringing forward the motion of the Richmond Road Association, Mr. Alexander explained that the proposed mealie-growers' union would be on co-operative lines; and that the idea of his Association was to establish a nucleus from which to develop.

Such an organisation as the proposed union, carried out on co-operative lines, will have a twofold effect upon the cultivation of mealies in this country. It will first of all prove an incentive to the farmer to put as much land as he possibly can under mealies, and secondly, act as a spur to induce him to expend as much thought and energy as possible on the production of high-grade corn. Not only will each supplier of mealies receive a fair price (allowing for grade) for his surplus grain, but he should also participate in the profits of the Association, be they great or small.

The New Maritzburg Abattoir.

FACILITIES FOR THE SLAUGHTER OF CATTLE.

ELEVEN years ago the great rinderpest plague swept over the face of Natal. Thousands of cattle succumbed to the disease, and the losses sustained by the farmers in cattle were enormous. East Coast Fever now threatens to sweep through those portions of the Colony already infected; and in order to enable the farmers in the infected areas, and those adjoining, to dispose of their cattle to advantage, the Government has erected an abattoir in Maritzburg.

In a short space of time, busy workers have erected, alongside the

present Government Cold Stores, an up-to-date abattoir for the slaughter of cattle sent in by farmers and others. The yards and buildings are enclosed by high galvanised iron fences, with strong gates. Iron fences also divide the enclosed area into three large paddocks, two of which are to be utilised for farmers' cattle and the other for butchers' stock. There are three entrances from the railway line (which runs within a few yards of the abattoir). Two platforms constructed alongside the line enable the cattle to be driven direct from the trucks on to the platform, whence they are conducted, by means of railed passages, down an incline to the general floor outside the abattoir. Once the cattle are in the abattoir enclosures, there is no possibility of their ever getting out again alive.

The abattoir itself is a clean, well-ventilated, concrete-floored structure, about 81 feet by 70 feet. The cement floor is traversed by shallow drains, which, with the means available for flushing the floor, enable the work of slaughtering to be carried out with every regard to cleanliness. Two cisterns collect the blood and offal, which is to be sent from time to time to the Central Experiment Farm for use as manure. There are at present ten killing pens, and there is room for more if required. After slaughter, the meat is hung at the far end of the abattoir, and from there it can either be taken direct to the railway trucks or may be passed to the cold storage. Two doors lead from the abattoir into the cold stores, a wall of the latter building forming one side of the abattoir.

The whole concern is characterised by the up-to-date methods employed, and by the regard that is being given to cleanliness and despatch. In the opinion of Mr. A. R. Burford, the Manager of the Cold Stores, there is probably no abattoir like this one in Africa. Arrangements are also being made for the watering and feeding of the cattle whilst they are in the kraals.

Mr. Burford, who was lately manager for Messrs. Crart & Co., of Maritzburg, has the whole direct management of the abattoir in his hands. His long experience in these matters will ensure the greatest possible efficiency in working arrangements, etc.

Everything is now in working order, and anyone desirous of sending forward cattle, sheep or pigs for slaughter can now do so. The provisional abattoir charges will be found among the Departmental notices at the end of this issue. These charges, it may be stated, will be subject to alteration later on, when sufficient time has elapsed to judge of their adequacy. Special rates will be quoted where quantities of cattle have to be dealt with and where meat only requires to be chilled.

Both the abattoir and the Cold Stores are now under the management of the Department of Agriculture. Revised charges for the Cold Stores are now being printed; and every information regarding the storage of fruit, vegetables and agricultural produce generally will be furnished on application being made to the Manager.

East Coast Fever.

TEST OF MR. TURTON'S ALLEGED CURE.

THE COMMITTEE'S REPORT.

THIS experiment was carried out for the following reasons:—(1) To show the public that East Coast Fever is transmitted through the agency of ticks, viz., the brown and red ticks. The names of the committee appointed to watch the experiment on behalf of the public are Messrs. F. Turton, William Craig, and E. C. Saville. (2) To test a cure said to be held by Mr. A. A. Turton for East Coast Fever. (3) To test a preventative said to be held by Mr. A. A. Turton. (4) To show that animals can only acquire the disease by being bitten by infected ticks. (5) To show that a salted animal does not contract the disease again, although bitten by infected ticks.

To put these tests to a trial, seven animals were selected and placed in a stable belonging to the Dundee Corporation (by kind permission of the Mayor). The committee, together with the Assistant P.V. Surgeon, Mr. A. A. Turton, and D.V.S. Bruce, agreed to carry out the test on the following conditions:—Four animals not known to have had East Coast Fever, to have ticks placed on them; two animals not known to have had East Coast Fever, to remain free from ticks, to be tied up alongside those with ticks placed on them; one animal known to have recovered from East Coast Fever, to have infected ticks placed on it. The animals were placed in the stable in the following order:—Nos. 1, 2, 3, and 4 to have ticks placed on them, Nos. 5 and 6 to remain without ticks, No. 7 (salted animal) to have ticks placed on it.

On the 16th March these cattle were placed in the order above described, and it was agreed that Mr. Turton should treat No. 3 with his preventative before ticks were placed on it; No. 1 to be treated with his preventative on the 3rd day after ticks were placed on it; Nos. 2 and 4 to be treated by Mr. Turton so soon as their temperatures reached 102.5; Nos. 5, 6 and 7 not to be treated. The selection of the four animals to be treated in the manner described was left entirely to Mr. A. A. Turton. A European officer with two native guards was placed in charge of the whole number, and it was agreed that neither Mr. Turton nor the D.V.S. should visit the enclosure unless accompanied by one member of the committee or conjointly.

With reference to the control animals (Nos. 5 and 6), it was pointed out that these animals had come from an erf where one animal had died from East Coast Fever, and where the aforementioned salted animal was brought from. It was also pointed out that it was possible and probable that these animals might be already infected, although not showing visible signs of disease (*i.e.*, in incubation period, which is known to be an average of 14 days). Mr. Turton personally stated in the stable in the presence of the committee, D.V.S. Power and D.V.S. Bruce, that he was not

satisfied that these animals were clean, but, on account of the difficulties which had arisen in securing the cattle, it was the anxious desire of the committee to proceed with the experiment, and it was accordingly decided to go on with the test.

The ticks were placed on the animals in the order named, *i.e.*, Nos. 1, 2, 3, 4, and 7, by D.V. Surgeons Power and Bruce in the presence of the committee and Mr. Turton. at 3 p.m. on the 16th March, an average of about six nymphae ticks being placed on each animal.

No. 1.—This animal was subjected to treatment by Mr. Turton on the 18th March, the 3rd day after the ticks being placed on it. His temperature remained normal until the 12th day after being infected, on which day his temperature rose to 103.2. On the 21st day his temperature had dropped to 102.3, and he looked decidedly better, although not chewing his cud; on the following day his temperature again started to rise, and on the 24th day was 105. This animal died on 10th April, 26 days after being infected with ticks.

No. 2. (Black and white ox).—This animal was not to be treated until his temperature started to rise, *i.e.*, to 102.5. On the 12th day his temperature rose to 105.2, keeping high, an average of 105 until the 19th day. On the 20th day it dropped, and he died the same night. After the 3rd day of rise in temperature (*i.e.*, 15 days after ticks were placed on the animal) he was visibly sick, showing staring coat, drooping ears, slight enlargement of the glands in the vicinity of the throat, loss of condition, but feeding moderately well, and discharges normal. The animal gradually got worse on the afternoon of the 20th day after ticks were placed on him. He was seen to be in a dying condition, showing dribbling from the mouth, slight running from the eyes, very drooping ears, coughing and not ruminating. It was observed that he was coughing for some days. His droppings at no time during his illness showed any marked change from a healthy state.

No. 3. (Black bull 18 months old).—This animal was treated by Mr. Turton immediately before ticks were placed on it. On the 13th day this animal's temperature rose to 104, reaching 105.4 on the 17th day; on the 18th day his temperature began to drop, and he died the following morning (19th day). On the second day after ticks were placed on it, this animal appeared to be suffering from the effects of Mr. Turton's inoculation, but recovered from this. On the 14th day he was visibly sick, showing symptoms similar to No. 2, although there was no marked coughing.

No. 4. (Yellow bull 2 years old).—This animal's temperature remained normal until the 12th day, when it reached 102.3. Mr. Turton desiring to treat at this stage he was allowed to do so. The following morning his temperature rose (13th day) to 104, varying from 103 to 107, the animal dying on the night of the 23rd day. *Post-mortem* was made the following morning at 9 a.m., but putrifaction had set in, consequently a satisfactory *post-mortem* could not be made. However.

it was observed that this animal's spleen was not enlarged and water in his bladder was normal.

No. 5.—This animal was tied up next to No. 4, with a small partition between them, and was placed there for the purpose of being a control animal, having no ticks placed on it. As before mentioned, this animal came from an erf where a beast had died of East Coast Fever, and at the time of placing it in the stable it was pointed out that the animal might possibly be infected. On the evening of the 14th day his temperature rose to 105, and the following morning his temperature was 104.3, from which date his temperature had not fallen below 103.2. On the 24th day his temperature was 105, and for several days previously the animal had been very ill, showing outward symptoms of East Coast Fever, *i.e.*, running at the eyes, dribbling at the mouth, excessive discharge of mucous from the nose, ears drooping, cessation of rumination, dung tinged with blood, enlargement of glands in vicinity of throat and flank, very great loss of condition, eating very sparingly, and in very depressed condition, and coughing. This animal died on the evening of the 8th instant.

No. 6. (Red yearling bull).—This animal was tied up next to No. 5, being the second control animal having no ticks placed on it. On looking at this animal's temperature chart it will be observed that he behaved in a most peculiar manner. On the 24th day his temperature reached 105.5, and was visibly sick, showing all the symptoms of No. 5. Death took place on Wednesday evening, 10th April.

No. 7. (Black and white heifer, salted).—This animal was tied up next to No. 6, and had ticks placed on it to prove whether a salted animal would again contract the disease when bitten by infected ticks. This heifer was not in very good condition when placed in the stable, but when handed back to the owner after the test was in a healthy condition, having improved wonderfully.

The conclusions arrived at by the committee are as follows:—1. That the brown and red nymphae ticks placed on the cattle Nos. 1, 2, 3, and 4, transmitted East Coast Fever and established beyond doubt that these ticks are the agents in conveying this disease. 2. That Mr. A. A. Turton does not possess a cure, and that his treatment had no beneficial effect. 3. That Mr. A. A. Turton's preventative failed to protect these animals against infection. 4. The committee is satisfied that the disease can be transmitted by the tick and is not conveyed from animal to animal. 5. That once an animal has had tick fever and recovered it is protected against East Coast Fever, for a time at least.

(Signed) F. TURTON.
WILLIAM CRAIG.
E. C. SAVILLE.

Dundee, 23rd April, 1907.

[Temperature charts, and *post-mortem* notes made by D.V.S. Bruce in the presence of the committee and Mr. A. A. Turton, were furnished by the committee.—Ed., *Agr. Jour.*]

East Coast Fever Regulations.

CLAIM FOR DAMAGES.

A CASE of interest to stock-owners has recently been brought before the Chief Magistrate, Durban (Mr. P. Binns), in which the plaintiff, an Indian, named Gengan, sued Mr. Amos, District Veterinary Surgeon, for £90 damages, the value of nine oxen which had been shot by order of the defendant.

It may be explained that plaintiff's cattle had been moved in an infected area. On this being reported to defendant, he ordered them to be shot, having power to do so under the East Coast Fever Act. Plaintiff claimed that, under the circumstances, he had no right to order their destruction.

Mr. Woollatt (Principal Veterinary Surgeon), in the course of his evidence for the defence, gave illustrations of the manner in which the disease was spread, and said that cattle were shot by orders of officers of his Department when they were moved about in an infected area. He stated that it was the practice of the Department to shoot all animals moved in defiance of the regulations: the Department did not move the cattle back and then prosecute the owner. It was the practice in the Department to accept the statements of local officers, and not hold enquiries before destroying the animals. Drastic measures had to be taken if the spread of the disease was to be arrested.

The Magistrate, in giving judgment, said that the case was one of great hardship for the plaintiff, and the evidence showed that he did all that could be reasonably expected of him, as he reported the movement of the cattle to the police the moment that he found that those whom he had placed in charge of the cattle had disobeyed his orders, and moved them from one place to another, and he regretted that the efforts of the plaintiff did not receive from the police that degree of support that they were entitled to. What, however, he had to decide was whether there was a breach of the law which justified the District Veterinary Surgeon (Mr. Amos), who was now sued in his personal capacity, in taking the action he did in ordering the shooting of the cattle. The evidence showed that Stock Inspector Oswald went to plaintiff's house on February 14th, where he met the plaintiff, who appeared to be aware of his position as an owner of cattle, under the East Coast Fever Act. On that occasion Oswald instructed the plaintiff that he should bring the cattle from where they were at that moment grazing and should quarantine them on his premises. It was also clearly established that Oswald handed the plaintiff a written notice stating that the cattle were in quarantine and that they were not to be taken away. There was no doubt that plaintiff understood the purport of the notice, for the first

thing he did was to send for the cattle and bring them on to his own premises. The next day he left for Durban, leaving the cattle in charge of his father, and while he was away these cattle were moved in defiance of his orders. In determining the rightness of the order given by Oswald, he had to take into consideration the place to which the cattle were driven back. The cattle were, as a matter of fact, driven from the residence of the plaintiff along a road which ran from the main Durban-Maritzburg Road to Bellair, and was much used by the people going through the Cato Manor Estate. They were also driven towards a district where there was an outbreak of the disease. There was no doubt that there had been a breach of the quarantine order, a breach of Section 5 of the Act, because the cattle were moved within an infected area. As had, however, been pointed out by Mr. Calder, in order to make the defendant liable, it must be shown that he exercised his powers under the Act recklessly, wantonly, and without reasonable cause. The burden of proof was on the plaintiff. Mr. Amos had under him the Stock Inspector, whom he was entitled to regard as a man to be trusted, and he received in the ordinary course an intimation from that man that there had been a certain movement in defiance of that law, and on that communication he gave the order that they should be shot. He was quite prepared to admit it was a great pity that the animals had been shot. If Mr. Amos had been on the spot, had been able to see the depositions, and been able to go into the local conditions, and make keen inquiry, no doubt his decision would have been different, but he had not exceeded the powers given him under the Act. There was a movement of cattle in contravention of Section 5, and he was entitled to give the order he gave. He exercised ordinary discretion in acting on the report of his subordinate officer, and in doing so he was not acting wantonly. He could not find him personally responsible. He would say, in conclusion, that Mr. Michel had argued the case exceedingly well, and he did not think he had omitted a point that could be urged. Plaintiff had his sympathy, but he was bound to find as he had. There would be judgment for defendant with costs.

Tenders for Mealie Meal.

TENDERS are called for in the *Government Gazette* (9th April) for the supply of mealie meal rations for the Natal Government Railways.

Quotations, in duplicate, addressed to the Chairman of the Tender Board, Auditor-General's Office, Maritzburg, for the supply of good, sound Colonial Mealie Meal, for the three months ending 3rd August, 1907, at Durban, Maritzburg, Estcourt, Ladysmith, Newcastle, Charlestown, Harrismith, and Bethlehem, will be received up till noon on Monday, 22nd April.

Quotation forms and all particulars may be obtained on application at the Stores Superintendent's Office, Durban.

Correspondence.

FARM TELEPHONES.

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

SIR,—I was much interested in the reference to telephones in "Ergates'" interview with Mr. N. C. T. Harper which appeared in the March number of the *Journal*, and I think it may be, in fact should be, of interest to all farmers to know how cheaply this form of communication can be installed.

There is no reason why every farmer should not be connected by telephone to the nearest telegraph office or railway station, but before this can be done it will be necessary to amend the law with regard to "Private Telegraphs" (telephones). A law would have to be passed which would give all landholders the right to construct, maintain, and use a private wire from his own property to the nearest public office or railway station, on the same lines as the law which now gives him the right to a road to the nearest main road, provision being made for the safety of the public at all road crossings and the Government making a charge for accommodation of instrument and attendance of clerk.

As telephones became more universally adopted, exchanges could be established at country stores, hotels, and other convenient points, which would enable farmers, district surgeons, etc., to communicate direct with one another as well as with the public offices.

The Government now erect private telephone lines at a cost of about £70 per mile; and I saw a notice in the paper a few weeks ago of a new regulation which fixes the charge made by the Postmaster-General for a private wire affixed to the existing poles of a Government line, at £4 per annum per mile, in addition to attendance charges.

An up-to-date farmer in the Ladysmith district told me some time ago that his telephone connection cost him £50 a year, and another farmer who wishes the Government to extend his telephone a further distance of something under five miles is asked to pay £27 a year.

Such charges are, of course, absolutely prohibitive to the ordinary farmer or resident in the country, and form an effectual block to any extended use of the telephone in this direction.

Steel poles, bronze wire, and the very elaborate and permanent fixings used on Government lines, although no doubt representing the best economy in their proper place, are quite unnecessary on private telephone lines. The cost of a wattle pole erected in place, even if renewed every two years, is far less than the interest charges on a steel pole.

Over two years ago I erected a telephone line about eight miles in length at the following cost:—

	£	s.	d.
11 coils No. 12 galvanised plain fence wire @ 13s. 6d. . .	7	8	6
2 small coils binding wire @ 1s. 6d.	0	3	0
100 insulators @ 1s. 6d.	7	10	0
95 wattle poles, 14 to 20 feet long, say	1	0	0
Transport of wire and poles, say	1	0	0
Labour, three natives 10 days each @ 1s.	1	10	0
Superintendence, say	5	0	0
	<hr/>		
	£23	11	6

Say £24, or £3 per mile without instruments.

I have lately extended the line another five miles, and used insulators which I obtained from Messrs. S. Butcher & Co., Durban, at 3d. each. Had I used these at first instead of those at one shilling and sixpence each the cost would have worked out to a little over £2 per mile.

With regard to the insulation of the wire, I was at first very particular on this point, but as part of the line passed through a bush where trees were being felled it was frequently down on the ground for distances of several hundred feet, and I found that even in wet weather communication was uninterrupted. In the extension above referred to, although there are over fifty points of support (trees and poles, only thirty insulators were used (the number that happened to be on hand), the wire being simply bound to a bolt near the top of the pole at the remaining points. The joints in the wire are knotted in the same way as a fence wire would be, and the earth return is obtained by wrapping four or five yards of wire in a bundle and burying it a foot deep in the ground.

I mention these details in order to show that no skilled labour or special knowledge is required to erect telephone lines, and, although I know that they are contrary to the teachings of text books and telegraph engineers' hand-books, they can be seen and examined by anyone sufficiently interested to come to Richmond to do so, and I shall be pleased to supply further details if required.

The instruments were bought some years ago from Messrs. Henwood, Son, Soutter & Co., and cost £4 10s. each, but if they can be obtained from the Durban Corporation at five shillings each, now is indeed the time, as "Ergates" points out, for farmers to instal private telephones.—Yours, etc.,

HERBERT G. DEMPSTER, A.M.I.C.E.

Richmond, Natal.

CANNING MEALIES.

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

SIR,—I should feel greatly obliged if any of your subscribers could tell me the way to can young mealies.—Yours, etc.,

Hill Top, Richmond.

F. HARCOURT.

WHEN DID LUNGSICKNESS COME?

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

SIR,—In reply to Mr. Gibson, When did Lungsickness come? As a boy I remember my father saying that Lungsickness came into Natal from a bull imported by Mr. Baker. This was, I think, in 1857. Where this bull was imported from I cannot say. Mr. Baker was a stock-farmer who lived between Greytown and Muden, Umvoti County. A Mr. F. Stieger, who now lives in Greytown, will, I should say, no doubt be able to give the right information.—Yours, etc.,

M. LANDSBERG.

Krantzkop.

FIBRE IN LONDON.

The following letter has been received by Mr. E. R. Sawyer, Director of Experiment Stations:—

DEAR SIR,—We have read your interesting report on *Sansevieria* fibre in the *Natal Witness* of 9th February.

We take the liberty of writing you that, should any planters or companies require the services of a London House to realise their shipments, we shall be pleased if you would keep our name before you.

We have had large experience in handling fibre, and any shipper can depend on our best attention to any business put before us. Any party wishing to know of our standing can make enquiries of any of the South African banks, to whom we are well known.

Thanking you in anticipation,—We are, etc.,

2, Coleman Street, London,
8th March, 1907.

MACKINLAY & CO.

District Reports.

IMPENDHLE, April 13th.—The rainfall since my last report has continued to be generous: 9.84 inches were registered during February, and 6.63 during March. The total to date since the beginning of September amounts to 40.07 inches. Crops as a consequence are looking well throughout the Division, though perhaps a little backward in some parts. The harvest should therefore be a record one, assuming, of course, that the coming of the frost will be delayed a little longer than usual, as it is to be hoped it will, otherwise only an average crop may be expected. Farmers are in anything but a happy frame of mind just at present. Horsesickness has swept through the Division with disastrous results. A large number of animals, some of which were valu-

able, have been carried off. Few owners have, I understand, escaped. Mosquitoes have been unusually plentiful this season, but it is curious how old standing theories are adhered to. Sceptics should, however, take note of the fact, and I should advise all those interested to make a point of reading the article on Horsesickness, by Dr Watkins-Pitchford, reproduced in the last issue of the *Agricultural Journal*. They will find in it much matter for digestion. Stock generally looks well, and the Division continues free from the various kinds of stock diseases. Hay-making by some of the farmers has been commenced, but operations in this respect are much retarded by the continuous rains. A great deal of Japanese millet has been cultivated this year, and is now ready to be reaped, but if fine weather does not come soon the probabilities are that the crop will be spoilt. There is less likelihood of this occurring as regards the hay. The grass has been slow in seeding this year, presumably on account of the rains; and as its condition is therefore still quite good it is likely to keep so until the fine weather sets in, as it should do, during the course of this month. Persons taking an interest in angling matters will be glad to hear that during the month of March a number of trout, varying in size from a quarter to three-quarters of a pound in weight, were caught in the Umgeni River, and safely transferred to the stream near Impendhle Village. For the information of anyone desiring to stock their streams, they might find help by copying the procedure adopted as regards these trout, which was as follows:—For the purpose of transferring the fish two large beer barrels were used, and in addition to these two cages made of half inch mesh wire netting. These cages were used for the purpose of holding the fish whilst they were being collected, and were sunk in the stream, so that the fish for the time being were in their natural element, and they remained there until the time for departure came. As soon therefore as the wagon was spanned, and the barrels filled with water, the fish were transferred to them from the cages. The wagon was then set going, and at each stream passed the water in the barrels was replenished. The result was that the fish arrived at their destination in as fresh a condition as when they were taken out of the Umgeni, and the lower reaches of the Furth stream, on the farm of Mr. Morphew. Fish were plentiful in both the streams referred to, and a far greater number might have been caught had the manipulators of three of the rods only knew how to work.

T. B. CARBUTT, Magistrate.

MTUNZINI, 30th March.—The weather, on the whole, for this time of the year has not been bad, and I am glad to say that the mouth of the Umhlatzi River still continues to keep open, consequently the mosquitoes are less troublesome and very scarce. The locusts have done a great deal of damage down the southern portion of this Division. During the month of February our total rainfall was 3.17 inches; during the present month only 1.7 inch fell, consequently we are badly in need of rain. So far the Division still remains free from cattle diseases. One horse died during the early part of the month, the property of Mr. E. A. Purser, Forester at Ngoye, the cause of death being Blue-tongue. I am informed that Mr. Wylie, Curator to the Durban Botanical Gardens,

and several other gentlemen have been spending a few days in the Ngoye Forest, collecting some rare specimens of palms and other plants, which have been taken to Durban Gardens.

R. G. ROBERTS, Acting Magistrate.

WEENEN.—Snakes appear to have been plentiful this season, and over two dozen heads have been forwarded by me to the Government Bacteriologist since the beginning of the year. A recovery from the bite of a black mamba is reported from the Tugela, but enquiries I have made by no means establish the identity of the snake. An Indian in the employ of the channel keeper was bitten by, presumably, a cobra, and has been successfully treated by the District Surgeon. Through the courtesy of Mr. Macpherson, the manager of the Experimental Farm in Weenen, I was permitted to see the factory for the cure of tobacco which has just been erected by Government, and which it is to be hoped will be largely taken advantage of by local growers. It is unquestionable that good tobacco can be grown here; and if only uniformity in the manufacture can be secured, as should now be the case, there is no reason why Weenen should not command the respect of the South African markets. A number of healthy looking varieties, almost ready for plucking, may be seen on the Government block. Experiments in lucerne are instructive, and leave no doubt as to the value of cultivation. The system of drainage, open and tile, now under attention should have its lessons for the surrounding blockholders. It is a matter for surprise and disappointment that so little interest is taken locally in the Experimental Farm as an educational concern. The majority of the holders of the irrigable allotments appear indifferent to the object lessons which may be learned there at Government expense. The opening of the new line, surely one of the greatest events in Weenen's history, should be an accomplished fact before the end of April. The official opening will probably be on the 17th.

C. G. JACKSON, Magistrate.

A simple rough and ready device for smoking bacon is sent by a correspondent to the New South Wales Department of Agriculture. The outfit consists of a large hollow log, a case, or a cask. If a log is used, cut off a piece about 4 feet in length, stand it on end, and drive a few nails round the top, inside, to hang the hams and shoulders on; then drive two forked sticks into the ground inside the log, one on each side; put a stick across, resting on the forked sticks, and upon this place two hooks—one at each end—upon which to hang two sides of bacon. With an inch auger bore a hole near the bottom, and when the pork is hung inside cover the top with two or three thicknesses of bagging. If the log is stood out of doors, a sheet of iron will be required for shelter in case of rain. Having everything in readiness, get a cold-blast smoker (obtainable at any leading ironmonger's), charge it with dozy—i.e., slow-burning smoky wood—and force the smoke through the auger hole in the log for about five minutes at a time three or four times during the day. A plug should be placed in the hole after each smoking. At the expiration of three or four days the bacon will be nicely browned and ready to take out.

Gardening Notes for May.

By W. J. BELL, Nurseryman, Florist and Seedsman, Maritzburg.

WHERE water is available small sowings may be made of Cabbage, Beet, Kale, Carrot, Lettuce, Mustard and Cress, Parsnip, Radish, Turnip, Spinach, and the various kinds of herbs, such as Parsley, Sage, Thyme, Marjoram, Savory, etc.

Earth up Cabbage and Cauliflower plants as required; keep the surface well stirred up between the rows of all growing crops, and commence to water freely as soon as dry weather sets in. Plants that are well advanced should have occasional applications of liquid manure, and especially the Cauliflower, if fine heads are required.

Peas also will be greatly benefited by weekly doses of liquid manure as soon as the pods have set.

Thin out root crops, such as Carrot, Turnip, Beet, Radish, etc., giving each plant sufficient space for full development. All root crops should be sown in rows, as then both thinning out and weeding are more easily done, and the hoe can be used with much more effect.

Celery should be earthed up as it becomes ready for the process, taking care to keep the soil out of the heart of the plant and promote unchecked growth by frequent supplies of liquid manure.

Cos Lettuce will be much improved by tying up for blanching. Strips of Rattia should be used for this purpose, as they are soft and will not cut through the leaves. Soak in water a few minutes before using.

Dig over any vacant pieces of ground that are to lie fallow during the winter, leaving them as rough as possible in ridges.

FLOWER GARDEN.

Sow in boxes in a well-sheltered position *Bellis perennis* (double Daisy), Carnation, Cowslip, Delphinium, Forget-me-not, Hollyhock, Pansy, Pentstemon, Polyanthus, and Primrose. The boxes must have plenty of drainage and be filled with nice sandy soil to within two inches of the top, and care should be taken that they are placed perfectly level and raised on bricks or stones.

Very careful treatment is required in the matter of watering fine seeds sown in this way, as failures are generally caused by want of attention in this respect.

Where the frost is not too severe in winter, all varieties of hardy annuals may still be sown in the open for spring and early summer flowering.

Towards the end of the month Dahlias and Chrysanthemums may be cut down. Dahlia tubers may be either left in the ground and covered over with a little litter or be taken up and stored away till

spring in dry sand or soil. Where moles are troublesome it is not advisable to leave them in the ground.

After cutting down the old stems of *Chrysanthemums*, the ground should be forked over all round the roots and the whole covered with a mulch of old decayed manure or litter for the winter.

In the spring they will send up a lot of young shoots, from which cuttings may be taken; after which the old stools should be lifted, divided and replanted in fresh soil. In any case they should never be left in the same ground a second season, as is frequently the case, throwing up a mass of weakly stems and producing miserable blooms when the flowering season comes round. From divided roots some varieties will attempt to bloom during the summer, but these should be cut down close to the ground in December; in fact, most of these plants will require to be cut down about that time. They will then throw up fresh flowering stems for flowering at the proper season in the autumn.

The plants grown from cuttings will not require this treatment, as they do not get the same start, but flower naturally at the right time.

SOWING OF TREE SEEDS.

This is the best time to sow most of the tree seeds, such as Pines, Cypress, Cedar, Juniper, *Casuarina*, *Eucalyptus*, Blackwood, etc.

Where only small quantities are required sow in shallow boxes. See that they are well drained by having holes in the bottom and a layer of broken brick or cinders, then a layer of rough fibrous loam, and finish off with nice light sandy soil to within two inches of the top. The boxes must be placed perfectly level, raised a little from the ground so as to admit of free drainage. Sow the various sorts of Pines and Cedars about a quarter of an inch apart, and cover with about half an inch of soil. The smaller seeds, such as *Cupressus*, *Casuarina*, *Callitris*, *Thuja*, *Cryptomeria*, and *Eucalyptus* should be sown thinly and covered with about a quarter of an inch of finely-sifted soil. The boxes should be in a sheltered place, but not under trees, and care must be taken not to allow them once to get dry, especially after germination has commenced.

Shade should be afforded immediately the seeds are sown by laying on the boxes a layer of grass or straw, which should be partially removed as soon as the seedlings are well through, and as they become stronger it may be removed altogether.

During 1906 the United Kingdom imported 2,426,644 cwts. of beef.

The total world's consumption of sugar during the year 1905-6 amounted to 13,915,849 tons as compared with 12,541,726 tons in 1904-5 and 13,111,620 tons for 1903-4. The world's production of sugar in 1905-6 was 14,164,894 tons. In 1905-6 it was 11,921,518, and in 1903-4, 12,678,743 tons.

Animal Diseases.

THE POSITION IN MARCH.

East Coast Fever.—The Principal Veterinary Surgeon (Mr. S. B. Woollatt) reports that, during the month of March, there were 18 fresh outbreaks, all within the infected districts, as follows:—Vryheid and Ngotshe 10, Paulpietersburg 2 (one on the farm Rooipoort and one on the Town Lands), Dundee 2 (on the farms Linchill and Oscarberg), Nqutu 2, Hlabisa 1, and Nongoma 1. In the Stanger and Mapumulo districts the disease still continues to extend. The whole of these districts is looked upon as one infected area. The following deaths were reported during the month:—Vryheid 615, Paulpietersburg 4, Dundee and Umsinga 22, Nqutu 90, Hlabisa 46, Nongoma 559, Lower Tugela and Mapumulo 1,000, Mahlabatini 56, Eshowe 8, Muden 8, Durban County 162, and Umvoti 8, making a total of 2,609. In the districts of Dundee and Umsinga, Hlabisa and Mahlabatini, temperature camps are still being used.

During the month, Mr. Woollatt says, in his report to the Minister of Agriculture, many cures for East Coast Fever were offered, and in two cases experiments have been carried out. In Dundee six animals were provided by public subscription and by Mr. Turton. In another portion of this issue will be found the committee's report on the experiment. In the case of the Dundee cattle it is to be regretted, Mr. Woollatt says, that two animals which were used as controls were taken over. These animals were objected to on the ground that they came from infected veld and were probably infected. This was pointed out at the time to the committee and to Mr. Turton, and was distinctly understood. Owing to the difficulties in getting other animals, both the committee and Mr. Turton were anxious that these should be accepted as controls and the test proceeded with: and owing to the risk of the whole thing failing through unless the animals offered were taken over, they were accepted on the understanding that they were probably infected. With regard to the four animals which were tick-infected by the Veterinary Department, there appears no doubt, Mr. Woollatt says, that they were free from infection prior to the ticks being placed upon them, as they had been kept in Mr. Turton's stables for some weeks previously.

In Durban another test was carried out. Mr. J. W. McKenzie, of Richmond, forwarded two young bulls to the Veterinary Compound to be tick-infected with a view to ascertaining whether a certain agent with which he had been treating these animals conferred any immunity or had any curative effects against East Coast Fever. These animals, a yellow bull and a black bull, were infected, in the case of the yellow bull on the 23rd March, with East Coast Fever ticks, and the black bull on

the 25th March. Both these animals died of East Coast Fever after the usual period of incubation and illness.

In both these tests blood slides were sent, and in each case were certified by the Government Bacteriologist as showing parasites of East Coast Fever.

The following cases of East Coast Fever, reported by the D.V. Surgeon, Stanger, are of interest as showing how infection can be carried from infected grass:—

In September last Mr. W. van der Wagen, residing in Stanger, was given permission to keep three cows and two calves (yearlings) tied up in his stable yard, on the understanding that they were to be kept tied up and fed, for which he gave his bond. One of the cows was lent to Mr. Van der Wagen by Mr. Jackson, of Stanger, their agreement being that Mr. Jackson should feed his cow on consideration of his obtaining some milk. Mr. Jackson cut grass on his farm near Stanger, adjoining the Stanger Commonage, which had been declared an infected farm, with the result that ticks were carried in the grass to the cow, and she died in December, 1906, of East Coast Fever. Mr. Van der Wagen, on the other hand, instructed his boys to cut grass amongst the sugar cane to the south of Stanger. This they must have done for some time, and, probably finding that there was plenty of grass nearer than the sugar cane, they must have cut on the commonage, with the result that, on the 17th March (six months after being bonded) one yearling died of East Coast Fever. Both Messrs. Jackson and Van der Wagen are quite satisfied as to how their cattle became infected.

Lungsickness.—During the month two fresh outbreaks occurred in the Krantz kop district, in the vicinity of the old outbreaks, and they are from the same source of infection and are really one and the same outbreak in this district. As is usual with cattle which are susceptible to Lungsickness, Mr. Woollatt says, that is cattle which have not been in contact with the disease by inoculating, the mortality is invariably high, notwithstanding that all care may be used in the method of inoculation and in the selection of virus. During the month there were 37 deaths from inoculation in the Krantz kop district. This mortality should demonstrate the absolute necessity of enforcing and maintaining strict quarantine on all cattle infected or in contact with infected animals, as the mortality in other parts practically free from the disease would be high, apart from the other losses incidental to this disease. "We are doing all we can to persuade the owners to destroy all cattle actually infected with the disease, and it is to be regretted that the Lungsickness Act does not provide for their destruction. While we are able to say that any animals are in a diseased condition, as we shall in the case of an old lunger, we intend to maintain a strict quarantine on such animals, and owners will be well advised if they dispose of these animals for slaughter if they are unable to see the policy of destruction when they are satisfied they are affected with the disease."

Horsesickness.—The mortality in this disease almost doubled that of February. The following deaths were reported:—Ladysmith 6, Newcastle 20, Utrecht 16, Inanda and Ndwedwe 14, Weenen County 125, Durban 35, Umvoti 40, Umgeni Division 96, Upper Umkomanzi 5, Lion's River 74, Dundee 21, Impendhle 19, Lower Umzinkulu 10, Alexandra 14, Ixopo 100, Polela 34, Underberg 25, Paulpietersburg 9, Vryheid 45, Babanango 5, Umtungeni and Lower Umfolosi 1, making a total of 714 deaths.

The immunisation of mules is still being continued, and some further deaths have occurred amongst animals which had been issued as immune. Some six salted animals are reported to have died; there is only authentic evidence forthcoming in four cases. In other reports on the subject it has been made clear that with the varying degree of infection a few individual animals will die of Horsesickness after inoculation; and in seasons such as the present, when, as shown by the returns, the mortality has been exceptional, there is no doubt, Mr. Woollatt says, that the results of the inoculation of the mules for Horsesickness have proved it to be a success. It is, of course, understood that the individual who is so unfortunate as to lose an animal does not think so, but, taken in the aggregate, Mr. Woollatt thinks it will be admitted that the results are very satisfactory.

Sheep Scab.—During the month six licenses were raised:—Klip River 2, Umvoti County 3, Lion's River 1. Seventeen flocks were placed under license:—Estcourt 4, Weenen 2, Umvoti 1, New Hanover 1, Krantzkop 1, Lion's River 1, Polela 1, Utrecht 1, Vryheid 5. There are now 55 flocks under license.

Glanders.—Four outbreaks of this disease occurred during the month: Newcastle, Durban, Dundee, Vryheid.

"Stiffsickness" (3 days' sickness).—The P.V.S. reports that this disease is spreading rapidly throughout Natal, and exists at present in the districts of Newcastle, Dundee, Ladysmith, Paulpietersburg, Vryheid, and Nqutu. The mortality, as was the case in the Transvaal and Rhodesia, is insignificant. Eight deaths are reported from the Newcastle district. Owners of cattle cannot well mistake this disease, as it spreads rapidly amongst their herds and is characterised by great stiffness of the animal. The stiffness passes off in three or four days. Many animals become sick at the same time. A dose of purgative medicine, Mr. Woollatt states, produces the best results, but when large numbers are affected, the mortality is so small as to scarcely warrant this expense.

Blue-tongue.—D.V.S. Cordy (Greytown) reports that this disease has caused heavy losses among sheep in this district.

Quarter-evil.—D.V.S. Harber (Maritzburg) says a number of deaths were reported from this disease—chiefly from Lion's River Division. In Dundee Division 12 deaths were reported.

Importation of Stock by Sea.—D.V.S. Amos reports that 2 horses, 836 sheep, and 9 dogs were imported into Natal by sea during March.

Meteorological Returns.

Meteorological Observations taken at Government Stations for Month of March, 1907.

STATIONS.	TEMPERATURE (IN FAHR. DEGS.).				RAINFALL (IN INCHES).						
	Means for Month.		Maximum for Month.	Minimum for Month.	Total for Month.	No. of Days.	Heaviest rainfall in 1 day.		Total for Year from July 1st, 1906.	Total for same period from July 1st, 1905.	
	Maximum	Minimum					Fall.	Day.			
Observatory ..	83.7	68.2	89.1	62.1	1.96	14	.52	11th	36.91	31.41	
Stanger ..	86.1	65.8	96	60	2.36	17	.76	30th	33.73	31.09	
Verulam ..	92.1	67.9	98	61	2.21	9	.61	30th	31.66	25.76	
Greytown ..	89.7	46.0	100	39	2.73	14	.70	6th	31.62	23.59	
Newcastle ..	85.2	58.8	94	51	9.33	14	2.79	1st	54.24	29.16	
Ndwedwe ..	77.5	65.8	86	58	2.92	14	.58	11th	34.65	35.19	
Estcourt ..	84.1	58.0	90	54	3.80	13	.76	9th	25.21	24.72	
Mid-Illovo ..	78.2	61.1	89	54	3.50	16	.91	9th	36.74	26.28	
Port Shepstone..	82.5	68.4	85	60	..	..	..	..	..	..
Umzinto ..	82.6	56.2	87	54	2.46	9	.84	14th	40.68	33.14	
Richmond ..	79.2	59.2	93	51	4.88	19	1.14	14th	43.99	29.85	
Maritzburg ..	90.9	58.8	93	52	7.23	19	1.51	28th	46.7	24.32	
Howick ..	79.9	56.6	91	51	4.80	15	.71	30th	38.00	22.33	
Ladysmith ..	90.6	58.4	96	50	3.77	9	1.64	10th	..	..
Dundee ..	84.6	61.6	89	55	3.38	7	1.3	12th	32.52	27.3	
Weenen Gaol ..	91.1	58.5	96	52	1.68	14	.47	30th	27.50	21.80	
Impendhle ..	72.9	51.4	81	33	6.3	18	1.24	9th	41.07	..	
New Hanover ..	85.3	67.5	94	62	6.93	15	2.02	14th	50.49	25.08	
Vryheid ..	83.7	58.4	94	51	2.14	8	.72	17th	33.00	..	
Nqutu ..	82.1	59.0	91	54	2.58	11	.32	26th	..	19.71	
Nongoma ..	81.9	63.7	10	45	2.56	9	.60	16th	3.54	19.78	
N'Kandhla ..	79.8	53.3	89	41	2.78	11	1.17	15th	29.06	23.74	
Umlalazi ..	85.4	58.6	8	40	1.07	5	.50	24th	..	25.62	
Hlabisa ..	8.4	63.0	90	58	1.01	5	.39	28th	37.92	24.70	
Melmoth ..	83.7	61.8	95	56	1.88	10	.43	3rd	33.65	2.88	
Umbombo ..	83.0	63.1	91	58	1.03	9	.30	24th	42.72	..	
Buiwer ..	..	..	..	..	9.35	22	1.85	27th	..	..
Point ..	..	..	..	..	2.10	12	.67	10th	32.40	32.05
Camperdown ..	79.9	60.0	92	53	2.80	18	.52	28th	33.94	..	
Charlestown ..	77.5	52.1	84	44	4.90	10	.95	27th	49.12	..	
Ingwavuma ..	76.7	60.9	86	56	2.66	9	1.0	17th	..	..
Mahlabatini ..	83.4	58.7	95	51	1.22	9	.31	2nd	29.89	21.79	
Empangeni ..	..	..	..	..	1.14	5	.50	25th	23.01	28.11

Meteorological Observations taken at Private Stations for Month of March, 1907.

STATIONS.	TEMPERATURE (in Fahr. Degrees.)		RAINFALL (in inches).						
	Maximum for Month.	Minimum for Month.	Total for Month.	No. of days.	Heaviest Rain- fall in one day.		Total for Year from July 1st, 1906.	Total for same period from July, 1905.	
					Fall.	Day.			
Nottingham Road (C. J. King) ..	..	..	7.82	22	1.75	27th	45.67	35.01
Adamshurst (Wm. Adams) ..	90	54	5.51	16	1.27	8th	..	21.72	
Hilton College (W. Engel) ..	88	50	5.29	20	1.14	14th	48.05	24.61	
P.M.B., Town Bush Valley ..	..	..	8.14	19	1.70	28th	51.66	33.07
Mid-Illovo (Isimont) ..	89	61.09	3.50	15	0.91	9th	36.74	26.28	
Ottawa (G. Wilkinson) ..	..	..	1.88	8	0.48	11th	32.06	..
Mount Edgecombe ..	96	61	2.27	8	0.94	11th	37.08	28.61	
Biet Vlei (P. Otto, J.P.) ..	..	..	3.70	16	1.50	31st	28.91	..
Da ton (J. Pfofenhaner) ..	..	..	4.62	13	0.99	30th	34.14	..
Cedara (Hill Station) ..	90	49	5.51	12	1.17	30th	30.19	19.41	
Equeefa (W. Hawksworth) ..	92	64	3.01	14	1.23	15th	44.84	32.18	
Umaluto, Benava (E. W. Hawksworth) ..	..	..	2.84	1	0.91	14th	42.08	29.70
Branxhohne (Charles Scott) ..	..	..	5.03	15	1.56	1st	58.97	35.05
Winkel Spruit ..	87	60	2.17	14	0.65	1st	6.13	38.15	

Coal and Labour Return.

Return of Coal raised and Labour employed at the Natal Collieries for the month of March, 1907 :—

Name of Colliery.	Labour Employed.									Output.
	Above Ground.			Below Ground.			Unproductive Work.*			Tons. Cwt.
	E.	N.	I.	E.	N.	I.	E.	N.	I.	
Natal Navigation ..	30	84	276	17	292	168	—	—	—	18,502 18
Elandsbaagte ..	18	18	271	18	180	440	9	26	24	14,316 7
Durban Navigation ..	16	135	48	8	286	46	8	13	—	11,209 0
Natal Cambrian ..	12	40	149	9	301	81	2	2	1	10,416 15
St. George's ..	16	96	151	10	152	128	1	6	—	8,804 0
Dundee Coal Co. ..	16	11	189	9	66	369	1	—	20	8,380 3
South African ..	6	15	88	9	180	20	5	40	47	7,406 10
Glencoe, Natal ..	13	97	99	11	492	7	—	—	—	7,243 1
Newcastle ..	7	40	29	6	204	2	2	12	—	5,261 12
Natal Steam Coal Co. ..	1	47	3	2	196	2	—	1	4	3,288 14
West Lennoxton ..	5	2	65	2	35	105	—	—	—	2,780 0
Ramsay ..	2	10	52	4	70	102	3	6	19	2,055 12
Central ..	5	44	10	4	148	5	1	26	—	2,032 14
Tahana (Natal) ..	—	12	20	3	83	95	1	9	13	1,718 11
Zululand ..	4	45	—	1	43	—	1	13	—	689 6
Woodlands ..	1	4	4	1	8	3	—	—	—	86 0
Dumbi Mountaint ..	1	1	—	—	—	—	—	—	—	4 0
Totals ..	150	701	1,445	114	2,730	1,503	34	154	125	104,344 3
Corresponding month, '06	150	733	1,176	123	2,557	1,421	46	203	171	113,125 8

* Cost charged to Capital Account.

† February Return.

Maritzburg,
8th April, 1907.

CHAS. J. GRAY,
Commissioner of Mines.

Return of Coal bunkered and exported from the Port of Durban for the month of March, 1907 :—

	Tons.	Cwt.
Coal Bunkered*	40,027	11
Exported to:—		
Port St. John's ..	1	0
East London ..	3,721	13
Algoa Bay ..	6,338	15
Mossel Bay ..	370	0
Oudertown ..	14,124	19
Mauritius ..	1,066	4
Batavia ..	264	14
Total ..	65,214	19

* Includes H M. Warships.

Custom House, Natal,
2nd April, 1907

(Signed) GEO. MAYSTON,
Collector of Customs.

Return of Farms at Present under Licence for Lungsiokness and Soab.

STOCK INSPECTOR.	DISTRICT.	DISEASE.	OWNER.	FARM.
A. P. Craw ..	Ladysmith ..	Scab	A. W. Illing ..	Minitams
J. R. Cooper ..	Nkandhla & Nqutu	Lungsiokness	V. Gama ..	Claypoort
S. A. Brown ..	Underberg ..	Scab	L. Makoba ..	Middle Drift
			N. Matenjeni ..	Nquebeni
			J. A. Stone ..	
			T. de C. Arbuckle ..	Kerridge
			B. Phipson ..	Strathcampbell
			M. Fraser ..	Winterhoek
			R. C. Gold ..	Woo end
			J. R. Royston ..	Greenend
			J. van Whye ..	Silburn
			F. A. Hathorn ..	Saxuana
H. van Rooyen ..	Vryheid ..		Jonas ..	Witpoort
			Mjebe ..	Fresgewacht
			Machaba ..	Rooipoort
			Mgeslo & Co. ..	Hardcamp
	Ngotshe ..		G. Jordaan ..	Langervacht
			F. Zietsman ..	Broadacre
A. B. Koe ..	Portion of Estcourt		H. v. d. Berg ..	Wydgelegen
			H. J. Hatting ..	Servitude
			A. H. Bennett ..	Winterton
			R. P. Summerhill ..	York Grange
A. J. Marshall ..	Dundee ..		T. Wood ..	British Empire
			R. J. du Bois ..	Giba
			J. W. de Bruyn ..	Rooifontein
			C. M. Vermaak ..	Paddock
			L. W. Meyer ..	Langverwacht
			A. L. Jansen ..	Strathearn
			J. O. Nel ..	Earncliffe
			A. C. Vermaak ..	Sigtuna
			T. C. Vermaak ..	Harrietdale
			H. Vermaak ..	Paddock
E. Varty ..	Western Umvoti ..	Lungsiokness	W. J. Slatter ..	H. Im Lacy
		Scab	H. Hansmeyer ..	On Rust
			O. H. van Rooyen, senr.	Good Hope
J. J. Hodson ..	Ptn of Lion's River	Lungsiokness	Mrs Vear ..	Brookdale
		Scab	G. H. Burgmann ..	Bos 1 oek
			W. A. Dales ..	Gowrie
			N. McKellar ..	Glenafon
			R. Spiers ..	Moyeni
R. Mayne ..	Krantzkop ..		W. W. Mare ..	Doomhoek
		Lungsiokness	P. H. Nell ..	Broeder's Hoek
			Maqamganse ..	Loots Hoek
			Uqupu ..	Myoniezwe's Locat'n
			Ndabane ..	"
			S. Johnson & Co. ..	Inadie Store
			Ndabane ..	Myoniezwe's Locat'n
			Natives ..	Spitzkop
			"	Myoniezwe's Locat'n
		Scab	J. S. van Rooyen ..	Spring Grove
A. H. Ball ..	Weenen ..		P. J. Nel ..	Ungegund
			J. J. Vermaak ..	Winterhoek
			L. J. & T. C. Lotter	Waterfall
			I. J. Meyer ..	Victoria
A. Brown ..	Polsa ..		L. Molefe ..	F.P. 142, Polsa
L. J. Trenor ..	Harding ..		R. Mack ..	Wetherby
G. Daniell ..	Vryheid ..		J. E. Steenkamp ..	Bloemhof
			G. Combrink ..	Goedeloop
			D. Coetzee ..	Rustplaats
			J. E. Greig ..	Mansfield
			J. Wiggett ..	Bloemhof
R. Mayne ..	Eastern Umvoti ..	Lungsiokness	C. van Rooyen ..	Boschfontein
			D. A. Nel ..	Glen Boig
			Nkahl and others	Loots Hoek
J. Burton ..	Portion of Estcourt		J. Bird ..	Mool River T'n Lda.
		Scab	J. Phipps ..	Littlecote
E. Parkinson ..	New Hanover ..		Ndabeni and Jim ..	Location
A. Hair ..	City and Umgeni ..		Umbabana ..	Zwaartkop Location
D. M. Pfaff ..	Utrecht ..		F. Badenhorst ..	Zaaihoek
			G. S. Dicks ..	Groot Vlei

MANGE IN HORSES EXISTS AS UNDER.

Name.	District.	Name.	District.
W. E. Oates ..	Bergville	Nseleni ..	Underberg.
H. Turner ..	Lidgerton	A. G. Stafford..	Harding
Mboyea ..	Bergville.	R. Thompson ..	New Leeds

Market Reports.

(Responsibility for the accuracy of the Statements and Opinions of the following Reports rests with the respective Contributors.)

JOHANNESBURG.—Mr. Alfred Webb, P.O. Box 2342 (representing the Farmers' Co-Operative Association of Cape Colony), under date 10th April, reports :—

Fruit—Bananas, 3s to 3s 6d per hundred; pineapples, 1s to 1s 9d per dozen. *Butter*—10d to 1s 6d per lb. *Eggs*—New laid, 2s 9d to 4s 6d per dozen. *Bran*—8s to 8s 6d per 100 lbs. *Chaff*—3s to 3s 3d per 100 lbs. *Forage* (local)—6s 6d to 7s per 100 lbs. *Hay* (sweet)—2s per bale. *Kafir Corn*—11s to 12s 6d per bag of 200 lbs net. *Lucerne* (green)—33s 4d per 100 bundles. *Mealies*—Yellow, 12s to 12s 3d; white, 12s to 12s 6d; mixed, 12s per bag of 200 lbs. net. *Onions*—9s per bag of 120 lbs net; seed, 10s to 12s 6d per bag of 130 lbs net. *Potatoes*—13s 9d to 19s per bag of 160 lbs net. *Sweet Potatoes*—10s 6d per bag of 120 lbs net. *Oxen* (dressed)—35s to 38s per 100 lbs. *Pigs*—1d to 8½d per lb (live weight); each, 17s to 25s. *Sheep* (dressed)—5d to 6d per lb. *Ducks*—2s to 2s 6d each. *Fowls*—1s 6d to 3s. each.

Pound Notices.

NOTIFICATION is made in the *Government Gazette* relative to the sale, on Wednesday, 15th May, of certain impounded stock. The cattle will be sold by the respective poundkeepers at 12 noon on that date unless previously released. The pounds in question and descriptions of the stock are as follows :—

Estcourt.—(1) Five Kafir goats, mixed, no marks. (2) Four Kafir goats, one white, two black, and one red, all marked, cuts on front legs.

Finchley (Ixopo Division).—Bay mare, black points, indistinct brand on off shoulder, hog mane and tail.

Good Luck (Dronk Vlei).—Black mare, white star on forehead, long mane and tail, no brands.

Howick.—(1) Chestnut mare, pony, appears blind in the left eye, three white feet and blaze. (2) Bay mule, light coloured nose, branded P.D. on neck, A.L. on near hind quarter, found straying at Woodside by Natal Police.

Melmoth.—(1) Black cow, white patches on belly, long horns, branded P.B. on off hind leg, age about 12 years. (2) Red and white bull calf, age about four months, belonging to above cow. (3) Black heifer, age about 12 months, no marks or brands. The above cattle were impounded by G. Theunissen, of Emkini, on 22nd March.

Richmond.—(1) Red toli, no marks or brands (running on farm "O-godby," and reported by Mr. W. O. McKenzie as too wild to be driven to the pound). (2) Bay mare and bay foal (running on the farm "Penavon," and reported by Mr. A. Harcourt as too wild to be driven to the pound). This mare was found entangled in a barbed wire fence, and has been badly cut about.

Waschbank.—Black and white bull stag, old, branded I.C, probable value about £4 (running on farm "Balbrogie," Biggarsberg, and reported to be too wild to be driven to the pound).

Executives of Farmers' Associations.

ALFRED COUNTY FARMERS' ASSOCIATION.—President: A. G. Prentice, J.P. Vice-Presidents: C. Knox, J.P., L. T. Trenor. Committee: C. M. Etheridge, E. J. Gray, W. B. Rethman, H. W. F. Rethman, C. A. Howell, R. E. H. Fann, J.P., W. T. J. Gold, Dr. Case, Revd. S. Aitchison. Hon. Treasurer: H. C. Hitchens. Secretary: T. Tribe.

BOSTON FARMERS' ASSOCIATION.—President: Thomas Fleming. Vice-President: J. Geldert. Hon. Secretary and Treasurer, W. J. Fly.

CAMPERDOWN AGRICULTURAL SOCIETY.—President: John Moon, C.O.; Vice-Presidents: A. N. Kirkman, J.P., and G. Swales; Hon. Secretary: — Wilson.

CAMPERDOWN AND DISTRICT FARMERS' ASSOCIATION.—President: John Moon. Vice-President: F. N. Meyer. Hon. Sec.: L. Baker.

DUNDEE AGRICULTURAL SOCIETY.—President: F. Turton, Esq., J.P. Vice-Presidents: The Minister of Agriculture, the Mayor of Dundee, Messrs. A. L. Jansen, H. Ryley, and W. Craighead Smith, J.P. Hon. Secretary and Treasurer: J. McKenzie. Committee: D. C. Pieters, D. Macphail, W. H. Tatham, H. Baasch, M. Taylor, J. A. Landman, N. F. Hesom, A. W. Smallie, C. W. W. ysall, W. Craig, C. G. Willson, T. P. Smith, J. Campbell, J. B. Duboisee, W. R. Queded, A. Grice, D. Meumann, W. J. H. Muller, J. E. Caldwell, E. C. Saville, C. M. Meyer, A. J. Oldacre.

DURBAN COUNTY FARMERS' ASSOCIATION.—Patron: J. H. Colenbrander. President: J. McIntosh. Vice-Presidents: H. Westermeyer, R. R. McDonald. Committee: F. R. W. Böhmer, G. Compton, H. Freese, W. Freese, W. Gillitt, H. W. Koenigkrämer, H. W. Nichols, F. Schäfermann. Hon. Sec. and Treasurer: Frank J. Voek.

GOURTON FARMERS' ASSOCIATION.—President: W. C. Stockil, Esq., J.P. Vice-President: M. Sandison, Esq. Hon. Secretary and Treasurer: Frederick B. Burnard, Esq.

HATTING SPRUIT FARMERS' ASSOCIATION.—President: Wm. Craig. Vice-President, J. Campbell; Committee: J. J. S. Maritz, G. De Waal, H. J. Hearn, Thos. Brookes, N. Glutz, H. Glutz, W. A. Queded, J. A. Brookes, W. J. Hishop, Thos. Dewar, J. Humphries, W. H. Tatham, A. E. Norman, D. W. H. Tandy; Hon. Secretary and Treasurer: R. J. Hearn.

HIMEVILLE AGRICULTURAL SOCIETY.—President: Henry C. Gold, Dartford, Polela. Vice-Presidents: W. Little, R. Justice, G. Malcolm. Executive Committee: G. Malcolm, W. S. Johnston, P. McKenzie, W. Little, G. Royston. Hon. Secretary and Treasurer: Thos. E. Marriott, Brookdale, Polela. Assistant Secretary: F. W. Fell, Ericksburg, Polela.

HOWICK FARMERS' ASSOCIATION.—Chairman, Thos. Morton; Vice-Chairman, M. A. Sutton; Hon. Secretary and Treasurer, A. Clark.

INGOGO FARMERS ASSOCIATION. President: Angus Wood, J.P. Vice-Presidents: G. A. Finstone and J. Browning. Hon. Secretary and Treasurer: C. Watt.

IXOPO AGRICULTURAL SOCIETY.—President: W. Arnott. Vice-Presidents: F. L. Thring, J.P., John Anderson, C. E. Hancock, J.P. Committee: W. K. Anderson, J.P., Thos. Allen, J. C. Auld, H. D. Archibald, F. S. Benningfield, S. Boyd, F. E. Foxon, R.M., Wm. Foster, Jas. T. Foster, Geo. E. Francis, L. Gray, A. M. Greer, J.P., J. B. Greer, Wm. Gold, Jno. Gold, H. V. Hill, C. F. Harriss, A. E. Keith, R. Kennedy, Geo. Martin, W. Oakes, L. J. Phipps, T. F. Kempfry, J. W. Robinson, Jas. Schofield, M.L.A., A. Stone, W. H. Way, G. C. Way, A. H. Walker, M.L.A., J. L. Webb (F.R.C.V.S.). Hon. Sec: R. Vause. Hon. Ass. Sec.: C. K. D. Beales. Hon. Treasurer: T. A. nott.

IXOPO FARMERS' ASSOCIATION.—President: A. E. L. Keith, Ixopo. Vice-Presidents: Geo. Martin, Olybrooke, Ixopo; A. Kirkman, Luff, Ixopo. Hon. Sec. and Treasurer: Geo. E. Francis, Morningview Ixopo. Delegates to Farmers' Union: President and James Foster. Committee: F. Kempfry, R. Vause, C. E. Hancock, John Anderson, R. Greer, W. Oakes, D. Campbell, G. C. Way, James Foster.

KIP RIVER AGRICULTURAL SOCIETY.—President: ————, Ixopo; Vice-Presidents: J. T. Francis, J. G. Bester, W. Pepworth. Auditor: J. ————, Ixopo. Secretary: E. Scott, F.I.A. (Lond). Executive Committee: A. ————, D.

Bester, J. Farquhar, C.M.G., W. C. Hattingh, J. G. Hyde, Trev. Hyde, A. L. Horsley, W. Freer, L. A. Leonard, H. Nicholson, J. H. Newton, J. T. Sandalls, W. H. Roberts, H. C. Thornhill.

LION'S RIVER DIVISION AGRICULTURAL SOCIETY.—President: Graham Hutchinson; Vice-President: H. Nisbet; Executive Committee: H. Nisbet, M. A. Sutton, A. J. Holmes, J. Humphries, Jno. Pole, and W. A. Lawton; Auditor: W. J. R. Harvard; Hon. Sec. and Treasurer: Arthur F. Dicks, P.O. Box 1, Howick.

LOWER TUGELA DIVISION ASSOCIATION.—President: T. G. Colne, brander. Vice-President: Lieut.-Col. F. Addison. Hon. Secretary and Treasurer: H. Curtis Smith. Committee: A. S. L. Hulett, A. E. Foss, G. Stewart, J. B. Hulett.

MID-ILLOVO FARMERS' CLUB.—Chairman: L. G. Wingfield-Stratford J.P. Vice-Chairman: B. B. Evans. Hon. Secretary: J. W. V. Montgomery. Assistant Hon. Secretary: S. C. Phipson. Hon. Treasurer: Jos. McCullough.

MOOI RIVER FARMERS' ASSOCIATION.—President: C. B. Lloyd; Vice-President: R. Garland; Hon. Treasurer: H. A. Rohde; Collector: Capt. W. H. Stevenson; Auditor: Claude Scott; Hon. Secretary: E. Catherley.

MUDEN AGRICULTURAL ASSOCIATION.—President: Thos. Thresh. Vice-Presidents: Wm. Lilje, E. A. Grantham. Secretary and Treasurer: C. A. Selling. Committee: Otto Rottcher, Karl Lilje, Karl Rotter, Herman Schafer, Fritz Torlage, T. Braithwaite, Ernest Rottcher, C. H. Tilbrook, Rev. H. Rottcher (Hon. Life Member).

NEWCASTLE.—President: F. A. R. Johnstone J.P. Vice-President: C. Earl, J.P., Mayor of Newcastle; Angus Wood, J.P., Ingogo; O. Schwikkard, C.M.G., Newcastle. Secretary: Wm. Beardall. Treasurer: Ed. Nicola. Executive Committee: L. H. S. Jones, E. Phillips, H. C. Caldecott, C. Watson, G. Langley, W. A. Lang, W. J. P. Adendorff, J. E. de Wet, O. Davis, S. W. Reynolds, B. Pettigrew, G. W. Thomas, G. H. Bishop, H. R. Muir, M. C. Adendorff, W. Napier, P. Van Breda, Chriss Potha, G. Templer.

NEW HANOVER AGRICULTURAL ASSOCIATION.—President: R. H. Oellermann. Vice-Presidents: J. C. Watt, J.P., and J. A. Westbrock. Life Member: C. A. S. Yonge, M.L.A. Secretary and Treasurer: W. D. Stewart, New Hanover. Auditor: J. H. F. Hobbs. Committee: W. N. Angus, E. Bentley, W. W. Bentley, Edward Boast, H. W. Boast, E. E. Comins, G. R. Comins, C. Crookes, jun., G. Demont, H. Dunklemann, J. Duval, W. Fortmann, Dr. C. H. Herbert, J. Hillermann, J. H. F. Hobbs, H. Jacobson, H. A. Light, G. C. Mackenzie, A. F. Mackenzie, T. M. Mackenzie, J. Muirhead, J.P., G. Moe, J. Moe, O. Moe, G. Oellermann, F. Oellermann, R. H. Oellermann, J. C. Otto, H. Oellermann, E. Peckham, J.P., J. A. Potterill, S. Peckham, C. M. Scott, Rev. J. Scott, Wm. Schroder, J.P., Owen Solomon, J. H. Smith, Riby Smith, H. Thiele, F. Thiele, H. Vorwerk, H. F. Westbrook, W. H. Westbrook, C. Westbrook, T. Wolhuter.

NOODSBERG ROAD AGRICULTURAL ASSOCIATION.—President: Fritz Reiche, J.P.; Vice-Presidents: H. Mummbräuer, P. Rodehorst, W. Dralle, W. Wortmann; Committee: W. Bartels, F. Bosse, H. Brammer, A. J. Bruyns, H. Bruyns, Carl Dralle, H. Gebers, W. Gevers, J. H. Holley, jr., W. C. Holley, C. Hillermann, L. Koch, H. Köhler, F. E. Kuhn, M. Maister, H. Meiers, A. Meyer, H. Meyer-Estorf, H. W. Meyer, K. A. Meyer, H. Misselhorn, W. Misselhorn, K. Peters, I. Pfothenhauer, G. Rabe, G. Reiche, Joh. Reiche, W. Rencken, H. Rosenbrock, H. Schmidt, K. Schmidt, Rev. Jas. Scott, K. Seele, F. J. Smith, J. Thies, W. Witthöft, P. Worthmann, A. Wortmann, F. Wortmann, H. Wortmann; Secretary: Paul Vietzen, P.O. Singletree; Hon. Treasurer: E. Beurlen.

NOTTINGHAM ROAD FARMERS' ASSOCIATION.—President: W. Henwood, J.P., Vice-President: B. Greene; Auditor: A. Mengens; Secretary and Treasurer: C. J. King, Nottingham Road.

RICHMOND AGRICULTURAL SOCIETY.—President: John Marwick. Vice-Presidents: W. P. Payn, A. W. Cooper, J. W. McKenzie and Chas. Nicholson. Honorary Treasurer: R. Nicholson. Hon. Secretary: Tom McCrystal. Committee: J. W. T. Marwick, Evan Harries, R. A. McKerzie, F. O. Howes, H. M. Moyes, W. Comrie, Thos. Marwick, J. C. Nicholson, J. W. Flett and E. J. B. Ho king.

ROYAL AGRICULTURAL SOCIETY OF NATAL.—President: Sir G. M. Sutton, K.C.M.G. Vice-Presidents: His Worship the Mayor, Messrs. Jas. King, O. Hosking, D. C. Dick, Col. E. M. Greene and P. D. Simmons. Executive: Sir G. M. Sutton, President; Messrs. Jas. King, O. Hosking, D. C. Dick, Col. E. M. Greene and P. D. Simmons, Vice-Presidents; Committee: G. J. Macfarlane, W. S. Oratt, W. H. Cobley, H. J. Stirton, W. J. O'Brien, L. Line and Sir T. K. Murray. Yard Superintendent: H. J. Stirton. Secretaries, Treasurers and Collectors: Duff, Radis & Co., 12, Timber Street, Pietermaritzburg. Auditor: G. V. Lambert.

SLANG RIVER (UTRECHT) FARMERS' ASSOCIATION.—Chairman: P. J. Kemp; Executive Committee: J. J. Uys, J. Z. Moolman, T. J. Botha, P. J. Viljoen, P. J. Kemp; Hon. Sec. and Treasurer, Thys Uys, Utrecht P.O.

UMVOTI AGRICULTURAL SOCIETY.—President: Major T. Menne. Vice-Presidents: Theunis J. Nel, M.L.A., W. J. Slatter, W. L'Estrange. Executive Committee: Tol Nel, A. Newmarch, W. Lilje, O. Rottecher, S. C. Van Rooyen, W. Newmarch, E. J. Van Rooyen, O. Norton, I. M. Nel, J. Browning. Managers of Show Yard: J. M. Handley and N. Hunter. Hon. Auditor: W. K. Ente. Secretary and Treasurer: W. H. Gibbs.

UPPER BIGGARSBERG FARMERS' ASSOCIATION.—President: George Langley; Vice-President: W. L. Oldacre; Secretary: J. H. Murray.

UTRECHT AGRICULTURAL SOCIETY.—Chairman: L. Viljoen; Vice-Chairman: B. H. Breytenbach; Members: I. Bierman, M. M. Knight, J. H. Klopper, B. C. Hattingh, T. Botha, M. Gregory, P. L. Uys, H. P. Breytenbach; Secretary: G. J. Shawe.

VICTORIA COUNTY AGRICULTURAL SOCIETY.—President: Lieut. Colonel F. Addison; Vice-Presidents: Sir Liege Hulett, Kt., M.L.A., W. J. Thompson, Esq., J.P., J. Polkinghorne, Esq., M.L.A.; Committee: Messrs. W. H. B. Addison, G. S. Armstrong, M.L.A., C. Bishop, J.P., D. Brown, sen., J.P., W. Campbell, T. G. Colenbrander, A. E. Foss, J.P., A. S. L. Hulett, J.P., J. B. Hulett, C. Jackson, G. Nicholson, J.P., T. Polkinghorne, J. W. Perkins, J.P., E. Saunders, J.P., G. Stewart, and J. H. Stansell; Hon. Secretary and Treasurer: H. Curtis Smith (Stanger).

WEENEN AGRICULTURAL SOCIETY.—President: A. F. Henderson, Esq., C.M.G.; Vice-Presidents: J. Button, J.P., Jas. Ralfe, J.P., H. Blaker, J.P., E. B. Griffin, J.P.; Hon. Treasurer: F. C. Schiever; Auditor: S. Wolff; Executive, Hon. H. D. Winter, R. H. Ralfe, J. W. Moor, D. W. Mackay and Allan Stuart; Manager of Show Yard: S. Vaughan; Assistant: A. Clouston; Hon. Secretary: E. Cautherley.

WEENEN COUNTY HORTICULTURAL SOCIETY.—Committee of Management: A. F. Henderson, C.M.G., F. C. Schiever, G. W. Linfoot, P. J. Nunn, Dr. Brewitt, S. Vaughan; Hon. Secretary: E. Cautherley.

ZULULAND COAST FARMERS' ASSOCIATION.—President: G. H. Hulett; Vice-President: C. Hill; Hon. Secretary and Treasurer: F. Brammage, Ginginhlovu.

(The Editor will be obliged if the Hon. Secretaries will supply him with lists of the Executives of their Associations.)

Central Experiment Farm, Cedara.

In order to minimise interference with the general course of work on the Central Experiment Farm, Cedara, it has been found necessary to set apart one day of the week, namely, Friday, as a visitors' day.

Arrangements will accordingly be made on that day for receiving visitors and showing them round the Farm. A trap will be at Cedara Station to meet the up 9.50 a.m. train; and if intending visitors from up-country will give notice to the guard at Howick Station, on their way down, a trap will be sent to meet the train which passes through Cedara at 11.2 a.m. Visitors travelling by other trains will also be met if they will previously make arrangements by writing.

On other than the visitors' day, visitors may be received by appointment, but special attention cannot be guaranteed in regard to their being shown round.

At least clear fourteen days' notice must be given by Associations, so that there may be time to make all necessary arrangements.

W. A. DEANE,
Minister of Agriculture.

9th April, 1907.

Agricultural Shows.

HIMEVILLE, Thursday, 16th May.—President : H. C. Gold. Hon. Secretary : Thos. E. Marriott, Brookedale, Polela.

BULWER, Wednesday, 22nd May.—All entries close 10th May. President : J. Isbister. Secretary : D. McK. Malcolm, Bulwer.

ROYAL AGRICULTURAL SOCIETY, 13th, 14th and 15th June.—All entries close 1st June. President : Sir G. M. Sutton. Secretaries : Messrs. Duff, Eadie & Co., 12, Timber Street, Maritzburg.

ESTCOURT, Wednesday, 19th June.—All entries close 8th June. President : A. F. Henderson. Secretary : E. Cantherley, Southdowns, Estcourt.

HARDING, Thursday, 20th June.—All entries close 6th June. President : A. G. Prentice, J.P. Secretary : Thos. Trite, Harding.

DUNDEE, Thursday, 27th June.—All entries close 12th June. President : F. Turton. Secretary : J. McKenzie, Dundee.

HOWICK, Thursday, 27th June.—All entries close 12th June. President : Graham Hutchinson. Hon. Secretary : Arthur F. Dick, Howick.

NEWCASTLE, Friday, 28th June.—All entries close 18th June. President : F. A. R. Johnstone, M.L.A. Secretary : Wm. Beardall, Newcastle.

LADYSMITH, Friday, 5th July.—All entries close 30th June. President : Herman Illing. Secretary : E. Scott, Box 90, Ladysmith.

UMZINTO, Thursday, 11th July.—All entries close 9th July. President : W. Thomson. Secretary : George Lamb, Umzinto.

DURBAN, 18th, 19th and 20th July.—President : W. R. Poynton. Secretary : J. D. Ballance.

RICHMOND, Thursday, 25th July.—All entries close 12th July. President : John Marwick. Hon. Secretary : T. McCrystal, Box 32 Richmond.

DATES NOT FIXED.

GREYTOWN (Date not fixed).—President : Major T. Menne. Secretary : W. H. Gibbs, Greytown.

MID ILLOVO (Date not fixed).—President : B. B. Evans. Secretary : C. B. Lowe, Mid Illovo.

NEW HANOVER (No Show on account of E. C. F.).—President : R. H. Oellermann. Secretary : W. D. Stewart, New Hanover.

NOODSBERG ROAD (Date not fixed).—President : Fritz. Reiche, J.P. Secretary : Paul Vietzen, P.O. Singletree.

STANGER (Date not fixed).—President : F. Addison. Secretary : H. C. Smith.

OTHER SHOWS.

PIETERMARITZBURG HORTICULTURAL SOCIETY, 17th October.—President : T. R. Sim, F.L.S. Hon. Secretary : S. Colman, Deeds Office, Maritzburg.

Brands Allotted to Infected Magisterial Divisions.

The following is a list of the brands which have been allotted to the several infected Magisterial Divisions:—Durban County, D. 2; Alexandra County, A. 2; Lower Tugela, T. 2; Mapumulo, S. 2; Inanda, B. 2; Umsinga, U. 2; Dundee, X. 2; Vryheid, V. 2; Ngotshe, H. 2; Paulpietersburg, P. 2; Nongoma, G. 2; Mahlabatini, L. 2; Ndwedwe, N. 2; Weenen County, W. 2; Umvoti, F. 2; Hlabisa, K. 2; Eshowe, E. 2.

East Coast Fever.

SLAUGHTER CATTLE.

THE Department of Agriculture has erected abattoirs adjoining the Government Cold Stores, Maritzburg, where people will be able to forward cattle from clean and infected areas for slaughter. Killing, chilling, and freezing can be undertaken by the Department if desired, and arrangements can also be made for the forwarding by rail of meat intended for sale in markets outside Maritzburg. This will enable farmers, who wish to dispose of their stock for slaughter and find a difficulty in so doing, to have their animals killed in Maritzburg and the meat forwarded to Durban or any other market. The abattoirs will be under the personal supervision of Mr. A. R. Burford, the Manager of the Government Cold Stores, who is thoroughly experienced in this particular class of work.

The provisional abattoir charges are :—

Cattle per head	...	...	1s., with a minimum of £3 per killing space per month.
Sheep	...	...	1½d. each.
Pigs	...	...	3d. "
Chilling and Freezing Beef,	1st week	...	1s. 3d. per qr.
"	2nd "	...	1s. "
"	Remaining weeks	...	9d. "
Sheep	...	...	per week ... 3d.
Pigs	...	...	" ... 6d.

Charges for killing and handling Cattle, and placing same in Cold Storage, if required, or meat to be taken away by customer from hanging-room :—

Cattle, per head	...	...	4s. each (including abattoir fee).
Sheep	...	...	6d. "
Pigs	...	...	1s. " up to 200 lbs.
"	...	...	1s. 6d. each, over 200 lbs. & up to 300 lbs.
"	...	...	2s. " over 300 lbs.

Department of Agriculture, Maritzburg,
9th April 1907.

W. A. DEANE,
Minister of Agriculture.

MOVEMENT OF CATTLE IN YOKE.

It is hereby notified, for general information, that, notwithstanding the prohibition contained in Government Notice No. 175, 1907, under which movement of cattle within the Magisterial Divisions of Umvoti and Krantzkop was prohibited, the movement of cattle in yoke for the purpose of transporting produce and supplies will be permitted within such Magisterial Divisions outside the areas described in the schedule to this notice, upon permission in writing being first had and obtained from the District Veterinary Surgeon or Stock Inspector of the District, and subject to any directions or limitations which may be imposed in the permission given.

Department of Agriculture,
Pietermaritzburg.
8th April, 1907.

W. A. DEANE,
Minister of Agriculture.

SCHEDULE.

The whole of the Tugela Native Location, in the Magisterial Division of Krantzkop.

The whole of the Umvoti Native Location, in the Magisterial Divisions of Umvoti and Krantzkop.

The area lying within the outer fenced boundaries of the following farms :—Scheeper's Dale, Springfield, Thornton, Noidocht, Mt. St. Bernard, Geluk's Stadt, Huis River, Deepdale, Lunenberg, Nels Rust, Roodebok Vlake, Sub-division A of Winterhoek, Krantzkloof, Landsberg, Mt. Ernestina, and the North Western corner of Summerfield.

Model Rules for Agricultural Co-Operative Societies.

THE Department of Agriculture has for disposal, at the rate of one shilling each, copies of Model Rules for the use of Agricultural Co-operative Societies. Applications should be made to the Secretary, Minister of Agriculture, Pietermaritzburg.

Trees for Sale.

To encourage tree-planting, transplants and seeds of forest trees are supplied by Government, so far as in stock, at the undermentioned rates, exclusive of carriage, from the Government Nursery, Central Experimental Farm, Cedara.

Transplants of Eucalyptus, Pines, Acacias, Casuarinas, Cupressus, etc., about 25 trees in each tin, at 8s. 4d. per 100 trees. Trees in separate tins at 1s. each.

Transplants of scarce kinds, larger trees, or surplus stock, when available, will be charged at special rates, which will be furnished on application.

Tree seeds, in variety, at 1s. per packet. Price per pound, which fluctuates, will be furnished on application.

Package and postage of seed, when required, charged 1s. per lb. extra.

Orders for present or spring delivery should be addressed to the **Forester, Cedara**, and must be accompanied by a remittance in cash or postal order. Cheques cannot be accepted.

T. R. SIM,
Conservator of Forests.

Employment Bureau.

THE Department of Agriculture has received applications from the undermentioned, who are prepared to become assistants or apprentices on farms. The Department will be glad to hear from farmers willing to take young men as assistants, and to place them in correspondence with the various applicants. When communicating on the subject, farmers may refer to the applicants by quoting the numbers in the following list:—

No. 92a.—Englishman, 50 years of age, with varied experience in tea and coffee planting in Ceylon, and also of contract work. Has also been on a Sugar Estate, and has had experience in pig rearing. Salary needed.

No. 93.—Young lady, 20 years of age, trained at the Reading Agricultural College and holding certificates for Poultry and Dairying, desires situation on a farm. Is prepared to take entire charge of poultry and dairy and, if required, would accept payment on results. Stated to be keen worker and thoroughly practical.

No. 94.—Scotchman, who has lived all his life in South Africa, desires employment on farm in connection with stock if possible. Was a Head Conductor during Boer War. Was 2 years with Transvaal P.W.D. as handyman. Produces good references. Desires salary.

No. 95.—German, of respectable appearance, who speaks English fluently, desires employment on a farm. Is 48 years of age, and has been accustomed to farm work, wire fencing, masonry, carpentry, &c. Salary required.

No. 97a.—Colonial, aged 22, bricklayer by trade, speaks Zulu, Dutch, and Hindustani, desires employment as a farm hand. Was on a farm in vicinity of Pretoria for six months.

No. 98.—Englishman, 25 years, desires situation on sheep and stock farm. Had experience of sheep on father's farm in Lincolnshire. Has been four years in Natal.

No. 99.—Englishman, 17, Colonial born, anxious to learn farming. No previous experience.

No. 100.—Englishman, 23, with experience gained in Richmond district, desires to get on to farm further up country. States he is active and not afraid of work. Wage no particular object.

Diamond Drilling.

SOME of the departmental diamond drilling plants are at present disengaged and available for hire for boring for either minerals or water. Particulars as to terms of hire may be obtained from the undersigned.

CHAS. J. GRAY,
Commissioner of Mines.

Bulletins Issued by the Department of Agriculture.

Single copies may be obtained free (excepting those with price attached) on application to the Secretary, Minister of Agriculture.

No.

- 1.—"Notes on Fruit Culture," by Claude Fuller. [1902]. (*Out of print*).
- 2.—"Manures on the Natal Market, 1902," by A. Pardy. [1902].
- 3.—"Insects in an Important Rôle," by Claude Fuller. [1904]. (*Out of Print*).
- 4.—"Manures on the Natal Market, 1903," by A. Pardy. [1903].
- 5.—"Weed Circular," by Claude Fuller. [1905].
- 6.—"Manures on the Natal Market, 1904," by A. Pardy. [1904].
- 7.—"Tree-planting in Natal," by T. R. Sim. [1905]. (*Price 2s. 6d.*)
- 8.—"Agricultural Co-operation," by E. T. Mullens. [1905].
- 9.—"Potato Culture" by A. N. Pearson. [1905].
- 10.—"Manures on Natal Market, 1905," by A. Pardy. [1905].
- 11.—"Agricultural Statistics, Natal, 1904-5." [1906].
- 12.—"East Coast Fever," by S. B. Woollatt. [1906].
- 12.—"Manures on Natal Market, 1906," by A. Pardy. [1906].

ULLMANN BROTHERS,

THE

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JOHANNESBURG.

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All other Agency Business Done. Correspondence Invited.

Our Market Report is to be found in another Column.



SOUTH AFRICAN PRODUCTS EXHIBITION.
Some of the Natal Exhibits.

Natal Agricultural Journal and Mining Record.

Timber-Felling in Natal Crown Forests.

By G. H. DAVIES, District Forest Officer.

IN the course of my official duties in the Natal and Zululand forests, which date from 1892 with but a few months' interval, I have been often challenged by old woodsmen to give a rational explanation of the system of section-marking as applied to indigenous forests. Accustomed to roam about the bushes and pick out any trees that suited the purpose of the moment, it has seemed a great grievance that necessarily hard toil should be increased by confining it to a small area, with a correspondingly small choice of trees, and often increased difficulties in the slipping of blocks and removal of sawn stuff. In the case of the average sawyer, his work is so heavy that he is apt to think that his own value to the commonwealth, as one wresting a living from the natural resources of the country, should outweigh all other considerations; and I have known a case in which a sawyer, petitioning against the enforcement of regulations, referred to his valuable services to the State in cutting down trees, as if Natal was so thickly wooded as to require clearing to make it habitable.

This brings us to the point. Natal is a bare country, and it is our duty to preserve the forests remaining to us as nuclei for extensions which may bring their aggregate area to a total proportionate to the area of the country; conserving the surface water and supplying forest produce. In this duty we are immensely encouraged by evidence that the bareness of Natal as regards trees is artificial and not natural. When Mr. J. Storr-Lister met me on the Qudeni in Zululand in 1902, he was greatly struck by the superior recuperative powers of our forests as com-

pared with those further west in the Cape Colony: proof enough that our bushes are not dying out of their own accord. On the one hand we have the fact that in old bush-workings we find the young growth vigorous wherever there is shade, drainage, and protection from fire; on the other hand we have the absolutely treeless veld where bush formerly flourished. The conclusion is inevitable that until bush is cleared, so as to allow the veld grasses to establish themselves and the veld fires to periodically invade forest land, the indigenous trees will persist in attempting to establish themselves. Indeed, so persistent are some species that they will be found in the open, scorched annually, but struggling year after year. Notable for this tenacity, in spots slightly protected by rock from fire and drought, is the Minza; while Saliekout takes years of exposure to lose its vitality, and would, if landowners took the slight trouble to have a yard or so of ground cleared round each plant, soon transform many bleak uplands into parks redolent with the sweet honey-scent of its flowers, and giving ample shelter to their stock. I have proved this myself; and was well rewarded, for surely it is the easiest kind of shelter-production possible, in two seasons. Saliekout gives a good, close-grained, though small timber; and is not destructive of veld pasture.

Of all methods that could be devised to destroy our indigenous forests, the old-time promiscuous tree-felling of the colonial woodsman is the most successful. This still obtains in native locations; and consists chiefly in allowing the sawyer to fell any trees he fancies, and dig a saw-pit where he likes. The natural result is that every tree within reach of the saw-pit, of which something can be made, is felled; and a bare space is left, littered with inflammable rubbish and connected with the outside veld by similar openings, along a broad wagon or slip track similarly littered. The surface, exposed to the sun throughout the day-time, soon produces a plentiful crop of briars, which, self-choking, form beneath them thickets of trash dry as tinder, ready for the first spark from a winter veld-fire to carry fierce destruction into the bush. A pretty glade is formed, in which long grasses flourish, and invite further fires every dry season to widen their domain. So the bush vanishes by acres annually.

With a view to stop this, Colonel Cardew in Zululand instructed the Nkandhla sawyers to select their trees over wide areas of bush, but he did not provide for the supervision necessary to enforce what would be a far greater hardship to woodsmen than is the correct system of sections.

The system of forest-exploitation based upon confining wood-cutting to small areas at a time gives the only practicable method of proportioning the crop reaped to the crop grown; by facilitating close supervision on the part of the owner of the forest, whose interest it is that the forest should not be destroyed. In the case of a private owner, living from hand-to-mouth, it is sometimes his interest to live on his capital, and "work-out" his bush regardless of consequences; but the Government

has not only to limit forest exploitation to its fair yield from motives of financial prudence, but because destruction of bush is a permanent injury to the country.

Sectional working being necessary to render proper supervision practicable, it is obvious that the owner or his agent must select the trees to be felled, or the sectional system would merely result in the bush being destroyed by sections. In the case of demarcated Crown forests the agent is the Forester; and it is his duty to mark a forest-section so that when the last tree in it is removed the section is left in the best possible condition for re-growth. When closed, the section should have as many young trees in it as when opened, except where they have been necessarily thinned to prevent crowding, and it should have no mature trees left, except where their removal would destroy the canopy favourable to seedling trees and hostile to briars; diseased trees should have been got rid of whenever possible, except when their shade is required, as is sometimes the case in our badly-treated bushes. The Forester selects the trees to be felled by marking them below the woodman's cut with a stamp protected by law. This mark, when properly made, lasts for years as evidence that the tree was selected for felling; but it is also necessary, for protection of the permanent forest revenue of Crown forests, that the selection should have been properly made. That is to say that the Forester should conscientiously mark, without reference to the wood-cutters' wishes, only those trees which it is the interest of the owner to get rid of: the mature, the crowders, and the diseased. In the case of the crowders he should exercise discrimination, and mark the less valuable, except where considerations of canopy, or of perfection of form, call for the retention of the lower-priced tree. Diseased trees should be first marked, then the mature, then the crowders, with great care not to mark any immature tree unnecessarily. While marking, the Forester should vigilantly look round to see what effect the clearance of each tree will have upon the shade, and to note what other trees have already been marked near the tree he is considering. Over-marking means either damage to the bush that will take years to heal; or, if great, absolute ruin. Under-marking, at the worst, means failure to improve the section by letting in sufficient light and air to the young growth. Either of these faults shows an incapacity of the Forester, of which the effects will be felt for many years, but if he honestly does his best experience will soon come to his aid, to the great advantage of the forests in his charge. For freedom of choice, and to avoid the shadow of suspicion, the Forester should never mark trees in the presence of possible customers.

The woodsman or sawyer has, in his pecuniary stake, an advantage over the Forester in estimating the value of standing timber. Owing to the waste that resulted from the system of charging for sawn timber, and to the opportunities that system gave for dishonest practices, trees

are now sold standing in Crown forests under the control of the Department. The stems are measured, and their content estimated, by a simple method which results in the purchaser's favour in the cases of sound trees. It is, however, when trees are partially unsound that difficulty comes. I have known an old woodsman to be taken in by concealed rot, but very rarely. The purchaser has to pay, in cash, the estimated value of a tree before he can lay his axe to it, and a mistake means immediate loss. He is not bound to buy that particular tree, but has the choice of many, marked and priced for him; and in nine cases out of ten it is the Forester that is taken in by allowing too much for possible rot. This is as it should be, for rotten trees should be got rid of whenever they are markable, but loud is the complaint when the loser is the woodsman. The latter usually forgets that he is generally the gainer by the system of standing measurement.

I hope that this brief sketch of the method followed by the Department in control of our Crown forests will give the general reader some information as to the principles underlying the successful treatment of indigenous bush. We cannot leave our native forests untouched; it is right therefore to improve them by directing the self-interested labours of the woodsman. Private owners of native bush, who do not wish their forests to be injured but improved by cutting, might with advantage follow the plan of having sections periodically marked by trained Foresters uninterested in the resulting sales of timber.

Notes and Comments.

LOCUST DESTRUCTION IN ARGENTINA.—The Argentine Government is about to issue a loan of 2,000,000 paper dollars for the purposes of locust destruction.

C.O.D.—In 1904 the Natal Department of Agriculture endeavoured to start a C.O.D. register by means of which persons desiring to sell or to buy on the Collect on Delivery System could be placed in communication with one another. Our efforts did not, however, meet with much response, so that the register was ultimately abandoned. We are, however, endeavouring to resuscitate the matter, and readers are referred to fuller particulars to be found in this issue.

VETERINARY DEPARTMENTAL REPORTS.—It will be observed that the Veterinary Departmental Reports are no longer published as such. The information contained in those reports is, however, re-written each month and published under the heading of "Animals Diseases." The same amount of information as appeared before is being published; but in its new form it occupies far less space and will probably to some prove more readable.

THE FIBRE INDUSTRY.—In this issue is published information regarding fibre cultivation in German East Africa. This, combined with the article on fibre cultivation in the Philippine Islands, which appeared in the last issue of the *Journal*, and the articles by Mr. Medley Wood and Mr. Rositzky which were contributed to the March and April numbers, furnishes fairly complete information on almost every point which has so far arisen in connection with the various enquiries made of the Department of Agriculture regarding *Fourcroya gigantea* and *Agave rigida*.

PROBABLE YIELD OF CROPS.—The thanks of the Department are due to those gentlemen who have assisted in the estimate of the probable yield of main crops of the Colony, particulars of which appear in this issue. The information is of considerable value to merchants and contractors, enabling them to estimate the harvest upon which they can rely, and to frame their orders or requirements accordingly. By means of the honorary correspondents referred to in another "Note," it is hoped to be able each year to continue this estimate of probable yield with more and more approach to accuracy in accordance with the experience gained each season.

CAPE FRUIT AND THE CODLIN MOTH.—Consignments of apples and pears which have recently been coming to hand from Cape Colony have been infested by Codlin Moth to such an extent that the Natal Department of Agriculture has been compelled, in the interests of fruit-growers of this Colony, to destroy the fruit. The Codlin Moth is, perhaps, the pest of which the Natal fruit-grower stands in most dread. At present we are free from the insect, and it is only by a thorough examination of all apples and pears imported into the Colony that we can hope to continue to enjoy our immunity. The Cape Department of Agriculture has been communicated with regarding the necessity we are under of destroying all infested fruit, and has been advised to request the railway authorities of that Colony to accept no further consignments of apples and pears for Natal, as the consignors will otherwise only be put to the expense of railage for nothing.

COLONIAL MEAT FOR THE TROOPS.—Owing to the instrumentality of the Minister of Agriculture, fresh meat has now been substituted for the frozen meat contracted to be supplied to the troops at Fort Napier. The fresh meat is being supplied at the same rate as the frozen meat; and the change should be of great benefit to the stock-owners of the Colony.

GOVERNMENT COLD STORES.—We understand from the Manager of the Government Cold Stores (Mr. A. R. Burford) that the produce at present in the Cold Stores consists of over a thousand bags of potatoes and a considerable quantity of butter. With potatoes at their present unremunerative prices, it would seem strange that greater advantage should not be taken of the Cold Stores by farmers, as a means of storing portions of their surplus crop until more remunerative prices are obtainable, or until arrangements could be made for their export to other South African markets, or even abroad.

LITCHIS FOR EXPORT.—The litchi is a fruit that deserves to be more widely cultivated in Natal than it is at the present time. It seems to grow well—though, as far as we know, it is a fruit that will do better on the coast than anywhere else—and samples that we have seen have looked very healthy. There is a growing market for it in the United States, where the dried fruit is becoming more extensively known. In a "Report on Agricultural Investigations in Hawaii," issued by the U.S. Office of Experiment Stations last year, it is stated that the dried fruits from China sell in the Washington market for about two shillings a box containing about one quart. We should be glad to have the views of readers of the *Journal* as to the possibilities that lie before this fruit in Natal.

DE-NATURED ALCOHOL.—This matter was touched upon in an interview by "Ergates" in the last issue of the *Journal*, and the views of Mr. Gilbert Wilkinson were then given. In brief, the proposal is to manufacture in Natal alcohol for use in connection with motor cars, motor bicycles, and motor engines generally. There is a big and growing demand in South Africa for this form of motive power, and this demand could easily be supplied from Natal if the requirements of the excise could be met. The sole object of de-naturing is so to treat alcohol as to make it absolutely undrinkable. It is astonishing what a dipsomaniac will drink in order to satisfy his craving, but chemical research has now brought to light compounds which will deter even the most depraved tastes from attempting to satisfy their thirsts with "de-natured" alcohol. Motorists are interested in the question of this local supply; and it is quite probable that the early future will see a new use for our Natal rum.

EMPLOYMENT BUREAU.—By means of the advertisements inserted in each issue of the *Journal* under the heading of "Employment Bureau," we have been able successfully to place many deserving young men who have been anxious to acquire practical farming knowledge with Natal farmers. Anyone desirous of obtaining the services of agriculturists in any capacity is at liberty to make use of this Bureau, and all enquiries relative thereto should be addressed to the Secretary, Minister of Agriculture. No charge is made.

CEDARA EXPERIMENT FARM.—Owing to the growing popularity of visits to the Central Experiment Farm and the consequent strain upon its resources in providing for the showing round and entertaining of large numbers of visitors, it has been decided that there shall in future be only one day a week, instead of two, set apart for the reception of visitors, viz., Friday, and that there shall be a limit placed upon the numbers of delegates from each Association. A notice is accordingly published in this issue stating that, in future, the delegates from any particular association will be limited to twenty-five per cent. of the membership. The cost of all free passes to delegates will in future be a charge against the Experiment Farm vote, and this forms an additional reason for limiting the attendance.

CO-OPERATION AND EXPORT.—Export trade, so far as agricultural produce is concerned, is in the majority of instances built up by the co-operation of the "small" man, and not, as seems to be expected in Natal, by that of the large farmer. It is the difficulty experienced by the small farmer in disposing of his produce which leads to co-operation and, ultimately, to export. As an extreme example of what can be done by the co-operation of small men may be instanced the blackberry. This grows wild in the hedge rows of Great Britain, and only a few pounds can be obtained at a time by one picker, yet, during the season, from some localities blackberries are sent by the ton to the London market—the gross weight being made up by the small pickings of large numbers of individuals. So far as Natal is concerned, there is more hope of an export fruit trade from the small holder (*i.e.*, the man with from 10 to 200 or 300 acres) than from the large farmers. The small man, being dependent for his income on the sale of fruit and not having other strings to his bow, will be forced to give that minute attention to his work by which alone success will be achieved. The mealie grower on a small scale is more at the mercy of the merchant than the large farmer, who can often find his own market, and, though the initiative in co-operation may, as it often does, come from the large farmer, yet the small man, so soon as he realises the benefit or it, will be a more constant supporter of co-operation than his larger and wealthier neighbour.

CITRUS FRUIT CULTIVATION.—An interesting serial article by Mr. Masters, of the Cape Colony, on his system of citrus cultivation has been running through the last few numbers of the *Cape Agricultural Journal*. There appears to be much to commend his system, which he contends is unconsciously based on natural evolution. Having found a suitable stock for what is wished to be grafted, a healthy scion produced by the same is again grafted on to the same stock, and, again, a third time the process is repeated; with, so he contends, astonishing results. His statement is that, by this process, both the scion and the stock become more and more sympathetic to one another.

HONORARY CORRESPONDENTS.—In order to increase the usefulness and the value of this *Journal*, endeavours are being made to secure the voluntary services in the various districts of the Colony of honorary correspondents for the purpose of being kept regularly advised of the weather prevailing in each locality, the condition and prospects of crops and stock, increases and decreases in acreage of staple crops, and other information which, when collated and published each month, should be of considerable value to the Colony as a whole and help in the disposal of produce and stock. It is hoped to start a new system in time for the June issue of the *Journal*; and the District Reports formerly furnished by the Magistrates of the various Divisions will, at the same time, be discontinued. The Department will always be glad to receive any suggestions for the improvement of the *Journal*, and a circular letter inviting suggestions has been sent to each Agricultural Society in Natal.

SOUTH AFRICA AS A WHEAT-PRODUCER.—The *S.A. Trade Journal* states that the Cape Department of Agriculture is conducting experiments with a large number of wheats in order to test side by side their relative merits, but more particularly to ascertain, under identical conditions, their respective rust-resisting powers. "The production of an absolutely rust-proof wheat would mean a great economical change for South Africa. Instead of importing wheat and flour to the value of well over a million sterling, she would probably finally to some extent become an exporter." Natal is not a wheat-producing country, and cannot, for several reasons, hope to be to any appreciable extent. It must, nevertheless, be the desire of everyone that the large sums of money that are annually sent out of the country for the purchase of breadstuffs should be kept within South Africa. South Africa must feed herself: and, taken as one large country, we can very well produce all of our necessities, and many of our luxuries, provided the required organisation is forthcoming. The results of the Cape experiments with wheat—which must, of course, extend over several seasons—will be looked forward to with much interest.

INTER-COLONIAL CONFERENCE ON LOCUST DESTRUCTION.—The Inter-Colonial Conference on locust destruction was held at Pretoria on the 17th May. Natal was represented by the Hon. W. A. Deane (Minister of Agriculture) and Mr. Claude Fuller (Government Entomologist). It is hoped to publish a short account of the proceedings in the next issue of the *Journal*.

LECTURES ON CO-OPERATION.—The Treasurer of the Cape Colony has now formally signified his willingness to allow Mr. P. J. Hannon, the Cape Expert, to visit Natal for two or three weeks after the next Session of Parliament for the purpose of helping forward our local co-operative movement. As the Cape Parliament is meeting late this year, for the same reason that delays the Natal Parliament, viz., the attendance of the Premier in England, it is not likely that Mr. Hannon will be able to come here before next September. Arrangements were previously made by the late Government for Mr. Hannon to visit Natal, but on account of the outbreak of our Native Rebellion his visit had unfortunately to be postponed.

A Native headman, named Mazwe, residing in the Umtata district, has, according to the local paper, opened up the way for a new and important local industry which deserves attention and encouragement. Some little time back he purchased an ordinary American carpet broom, and noticing that some of the fibres had seed pods attached, he sowed the seed and has now a quarter of an acre of excellent "boom cord" (as the fibre is technically termed) under cultivation, and doing well. Mr. Heywood, the Conservator of Forests, is also experimenting with the seed, and reports favourably upon its suitability for cultivation in those parts. Mazwe manufactured a broom from his cord, which he exhibited at the Umtata Show, and was awarded a special prize.

INTERNATIONAL AGRICULTURAL SHOW AT THE HAGUE.—Attention has been drawn by the Consul for the Netherlands, in Durban, to a National and International Agricultural Show to be held by the Dutch Agricultural Society at the Hague from the 14th to the 23rd September next. All correspondence should be addressed to the Secretary of the Society, Mr. P. F. Posthuma, The Hague. The Netherlands Consulate at Durban will, at the same time, be pleased to furnish interested parties with any desired information. As the Colonial Exhibition in Holland has been such an unqualified success, any exhibits from Natal would command special attention. We would recommend those interested to place themselves in communication with the Secretary of the Society.

RAMIE.—In the *Textile Mercury* lately an article appeared on the subject of Ramie, in which the writer (Mr. Coventry) argued that Ramie ought to fetch far higher prices than it does. In the course of his remarks he made the following significant statements:—"A market for rhea (ramie) in the true sense of the term does not at this moment exist." "The demand is entirely from a small handful of European spinners, who appear entirely to control the trade." "The price is regulated by the supply from China, which is the over-production of an indigenous industry." "If a true demand arose among consumers, the amount required would be something enormous." "If spinners are really desirous of developing this important industry, they must encourage the grower and offer a price more commensurate with the intrinsic value of the product."

DONKEYS AS TRANSPORT ANIMALS.—The people in the Northern Territories who, as a consequence of East Coast Fever, have been assisted by the Government with transport animals in place of the oxen which have died, are experiencing much the same trouble with the donkeys as was experienced by only too many in the early rinderpest days. Donkeys appear to be peculiarly liable to a malady affecting the feet, which speedily renders them unworkable. In the rinderpest time alluded to, they died like flies in some localities. The advantages of donkeys as compared with mules are that they are cheaper and that profit can be looked forward to from the natural increase of the animals, whereas the mules are dearer and there can be no increase to compensate for that. Nevertheless, in view of the mortality to which donkeys are liable, it is questionable whether the advantages outweigh the drawbacks.

MULES AND HORSESICKNESS.—Under the heading of "Animal Diseases," in another portion of this issue, it will be seen that over a thousand horses died from horsesickness during April. When this exceptionally heavy mortality is taken into consideration, it must be admitted by everyone, Mr. Woollatt thinks, that the immunisation of mules has proved a success, for, of 800 animals immunised by the Veterinary Department, ten only have been reported to have died of horsesickness, and of this number only five Mr. Woollatt has been able to satisfy himself died of that disease. Allowing that the ten all died of horsesickness, it must be admitted that the results have been satisfactory, as all the animals have been running in areas notoriously bad for horsesickness. The immunised animals on hand with the Veterinary Department have not been kept in locations free from horsesickness, but, on the contrary, have been kept in places where infection is known to be virulent.

FOURCROYA IN NATAL.—Elsewhere in this issue will be found an illustration of a field of young plants of *Fourcroya gigantea* on Mr. Malcolm Mackenzie's farm, "Leckhampton," Inchanga. The plants, which are only five months old, were planted as bulbils, and their growth up to the present is said to have been marvellous.

PRINTING THE "JOURNAL" IN DUTCH.—In accordance with the promise made by the Minister, the first of a series of articles in Dutch will be found in this issue. They are translations of articles on co-operation, and were made by special request of Mr. Cheere Emmett, M.L.A. Reprints of the articles in question are being made and distributed in the Northern Territories with a view to arousing an interest in co-operation amongst our Dutch-speaking fellow-colonists. A translation of one of Mr. Watkins-Pitchford's articles on Horseshickness will appear in the following issue, and other articles of general interest will also be translated and appear from time to time.

ELECTRO-CULTURE.—The exceptional fertility of the soil in the Polar regions during years when the Aurora played more vividly and the air was charged with electric fluid, led Professor Lemstrom, of Helsingfors, to experiment with a view to ascertaining more or less definitely the effect that electricity has upon the fertility of the land. Mr. G. Clarke Nuttall, writing in the *Fortnightly Review*, says that during the years 1902-3 the Professor had experimental fields in England near Newcastle in connection with the Durham College of Science, in Germany near Breslau, and in Sweden at Alvidaberg, where he grew many plants under electric treatment. The results are stated to have been very remarkable. Strawberries, for example, in electrical fields showed an increase of from 50 to 128 per cent. over those grown in normal fields. Corn showed an increase of 35 to 40 per cent.; potatoes, 20 per cent.; beets, 26 per cent. Professor Lemstrom considers that, by the use of electricity in our fields, an average increase of 45 per cent. over the normal can be safely reckoned on for all crops grown on land of ordinary fertility, and that the system will pay. Electricity is, however, of no use on poor land. To give an idea of the method of working, it may be stated that in France in one case a sort of lightning conductor was set up in the centre of a field and connected with a network of wires running through the soil of the field. The electricity was thus drawn from the atmosphere. In this case an increase of 50 per cent. was obtained in the crop, which was one of potatoes. It remains to be seen how the system will work out in practice. Many experiments will be needed before such a revolutionary system can be taken up for purposes of profit.

REDUCTION OF FREIGHT ON MEALIES.—In a cable despatched prior to his sailing from Southampton, the Prime Minister (Hon. F. R. Moor) states that he has made definite arrangements for mealies to be carried from Natal to London at the rate of ten shillings instead of fifteen shillings per ton net.

SCHOOL OF AGRICULTURE.—Mr. C. W. Hannah, M.A., who has so successfully acted as House Master of the School of Agriculture since its inception, is leaving at the end of this term in order to take up farming. Arrangements are being made for the appointment of a successor who, in addition to acting as House Master, will be able to give lectures and instructions on agricultural subjects. The arrangements for the training of the students are, of course, directed by Mr. E. R. Sawyer, the Director of Experiment Stations. The school is now full up, there being no fewer than 30 students, so that every available room has had to be utilised for dormitories.

BLUE-TONGUE IN SHEEP.—This has long been recognised as a disease *sui generis*, having little in common with horsesickness except its seasonal influence and the probability of its transmission from animal to animal through the agency of flying insects. Several specifics have been brought forward of late which prove hopeful in their application. The Cape system devised by Mr. Spreull consists of the use of the serum of a recovered sheep, which serum contains an antidotal principle of use to sick animals, and is capable, when injected together with the actual virus of the disease, of producing a modified or mild form of the disease. This system is still *sub judice*. Another method of the treatment of Blue-tongue is that known as the Transvaal, or Dr. Theiler's, in which consists of the injection of the blood of animals in which a mild or attenuated form of the disease has been produced. This system is promising also good results in application, but the method must be considered also on its trial, for, whereas the best reports as to the protection conferred by the inoculation have been received from the midlands of Natal, the experiences of sheep-farmers in other parts of Natal have not been so encouraging. We understand a vaccine also is in course of elaboration at the Laboratory, Maritzburg, produced in a different manner, and that it is hoped that, before another Blue-tongue season, this preparation will be in a position to compete for the honour of the first place. It cannot but be encouraging to the sheep-farmer to see the scientific efforts being made in the direction of controlling a disease which has done so much to retard the sheep industry in South Africa in the past. We may rest assured that it will be but a question of time before this disease is brought within effective control by one process or another and thus relegated to its place amongst the maladies which have already yielded to the efforts of science (*e.g.*, rinderpest, pleuro-pneumonia, anthrax, quarter-evil).

NATAL TEAS IN LONDON.—In the course of a letter from Messrs. G. P. Hunt & Co., the well-known tea-blenders, of 228, Evelyn Street, Deptford, London, S.E., to the Hon. F. R. Moor, the writer says:—"I have had the pleasure of purchasing at the South African Products Exhibition almost the entire consignment of Messrs. Hulett's teas. I have since carefully tasted these teas against the China, Assam, and Ceylon products, and am of opinion that this new Natal flavour will find many patronisers throughout England. I am aware that such is not an universal opinion, but the past consignments of Hulett's tea were not, I consider, properly marketed, in a sense. It is preferable that small opening lots be consigned direct to distributors, who can market them to advantage, rather than to large brokers. So in this way a prejudice may have been created in the Natal mind against sending tea to England, from the results of previous exports." This extract from Messrs. Hunt & Co's letter will be read with interest by all our tea-planters, furnishing, as it does, an indication of some of the possibilities in the direction of the development of our tea export trade. There seems apparently no reason why Natal teas should not one day find as large a circle of patronisers as teas produced in other countries.

WATTLE BARK INSPECTION.—A correspondent has drawn the attention of the Minister of Agriculture to the question of the inspection of wattle bark at the Point prior to shipment abroad. In the course of his letter he says: "Wattle bark has, I believe, a good reputation on the market at present, but you are aware that some very old trees exist and the bark is thick and heavy, and some sellers may be inclined to include such bark with that of good quality unless some restriction is placed upon them in the same way that you intend to have mealies inspected before they are shipped." The writer has drawn attention to a matter of great importance. At present Natal is the leading wattle-producing country of the world, and our production is increasing every year. Last year we exported by sea some 14,700 tons of bark, valued at £89,056. There are, however, other countries striving in the same field; and it behoves us to give as much attention to the export of bark as to the export of other products of the country, and to maintain whatever standard of excellence we may have attained to in past years. Provided that standard is adhered to, we need have no fear from competitors for many years yet. It is in their own interests that planters should see that they sell none but the best bark. It may, however, be found necessary to institute an inspection by the Government. The matter will in all probability be discussed by the Wattle Growers' Union that is in the course of formation under the auspices of the Natal Agricultural Union, and their recommendations will be awaited with interest. Legislation would be necessary to give effect to the suggestion.

RAGPICKERS AS CO-OPERATORS.—Truly the co-operative principle is spreading! An article in *World's Work* describes the Ragpickers' Co-operative Societies of Paris. One of the co-operators attends at the Society's headquarters, and receives the refuse gathered for that day. Profits vary, but a member of one of these societies receives more than the independent unfortunates exploited by middlemen. Though rag-picking is not as a rule a very profitable profession, Verdier-Dufour, the "Rag King," has a turnover of four or five million francs a year—roughly, £150,000 to £190,000! Hundreds of women, trained ragpickers, sort the rags for him, and a most exhaustive portioning and classifying it is: what the "Rag King" cannot use may truly be said to be not worth using.

INSECT CATCHING PLANTS.—The plant referred to in the last issue of this *Journal* had already been reported upon by the Government Entomologist (Mr. Claude Fuller), who states that he believes its botanical name is *Physianthus albens*. "Owing to frequent references in foreign exchanges as to its remarkable nature, enquiries are often made as to the desirability of introducing it into the Colony. Of course there is no necessity to do so, and the plant, like most easily applied measures against insect pests, has no real value in this connection. That it does catch insects—bees and moths—all who possess a vine are well aware, but very seldom is anything of importance captured. At the same time, it is only right to point out that quite often specimens of the moth whose caterpillar is so destructive to the beards of mealies in Klip River District, and which is notorious as the Boll-worm of cotton, are found caught in this plant. As an adjunct to mealie fields where this pest is troublesome, and to cotton fields, this plant then might prove useful. It is very doubtful, however, whether the number of moths which it captures would make any material difference. The trapping of insects by the flower of this plant is purely accidental. The plant has no use for the dead insects, and does not 'wish' to catch them. The accident is due to the physical weakness of the insect. Like many another plant, it relies entirely upon the agency of insects for pollenization. The pollen sacs being securely packed away and hidden in the flower where they cannot escape, they require to be extracted forcibly. By a special contrivance of the plant, the insect is captured, so that in its struggles to liberate itself it will expend the force necessary to draw out the pollen sacs. If the insect is unable to do this it is trapped and dies." The insect which in its native clime visits and pollinates these flowers is strong enough to withdraw its proboscis with the stamen and pollen attached. As hinted in the paragraph in the last issue, the plant would probably do as much harm as good by entrapping and destroying useful insects, and is, therefore, not to be recommended.

BRANDING OF CATTLE.—The attention of all stock-owners is particularly called to the advertisement appearing at the end of each issue under the heading of "Brands allotted to infected Magisterial Divisions." The cattle in all these infected areas are specially branded as described in order to render easy of detection any illegal movement of cattle. If, therefore, any cattle should be seen being driven along highways branded in such fashion or come on to any farm, notice should immediately be given to the Police or to the nearest District Veterinary Surgeon or Stock Inspector. All such cattle can be immediately destroyed under the East Coast Fever Act on the order of a District Veterinary Surgeon without payment of any compensation to the owner thereof. As East Coast Fever can only be spread by such illicit movement, it is to be hoped that every one will be on the look out for any cattle branded on the cheek—as all these animals are.

REVISED REGULATIONS FOR THE DISPOSAL OF CROWN LANDS.—In another part of this issue will be found the new regulations for the disposal of the remaining Crown Lands of the Colony. In view of the limited amount of arable land now available for settlement, these revised regulations provide that applications should be limited to those of European descent. Instead of lands being put up to public auction, as was the case previously, the procedure now is for them to be advertised as available in the *Natal Government Gazette* and in at least one local newspaper. A fixed value will be placed upon each lot, and, in the event of there being more than one applicant, the matter should be decided by ballot. All applicants have to appear before and be passed by the Land Board. No person already owning 100 acres of rural land will be allowed to acquire any of these Crown Lands, but exception is made in the case of annual grazing leases. The lands will be rent free for the first two years, the third year's rent being payable at the end of that year, so that practically they are offered for three years free of rent. They are offered in freehold, and the instalments are spread over 20 years, so that, reckoning the first two years' rent free, it will be 22 years before the freehold is obtained. Personal and beneficial occupation of each lot will be insisted on; but there is no stipulation regarding the value of a house or improvements. The Inspector of Crown Lands has to decide whether the lands are being properly beneficially occupied, and appeal from his decision lies to the Land Board, whose decision is final. These lands will not be allowed to be transferred to limited liability companies, but can be ceded to properly constituted co-operative concerns. The survey fee has to be paid on date of allotment. Over one hundred applications have already been received for land on these terms, and any others desirous of acquiring land should apply to the Secretary, Land Board, as soon as possible and arrange to appear before the Board.

NATAL FRUIT GROWERS' ASSOCIATION.—Mr. Ernest D. Goble, secretary of the Natal Fruit Growers' Association, has written with reference to the pamphlet on co-operation (Bulletin No. 8 of the Department of Agriculture). He points out that the Dalton Association is not the only and most successful co-operative society in Natal, and draws attention to the Natal Fruit Growers' Association, which has been in existence as a co-operative concern since 1891. The annual turnover of the Association, he says, runs into thousands every year; and, though the membership is not a large one, numbers have joined and left at various times. The objects of the Association, as stated in the constitution, are "to foster mutual understanding and co-operation for the general protection and advancement of the fruit-growing industry, and to bring producers and consumers into the most friendly relations possible, as well as into speedy and economical contact." The Association has recently been remodelled; and includes among its objects the arrangement, control, and disposal otherwise of fruit grown by members of the Association. No person is eligible for admission as a member who is not the *bona fide* grower of an estate of not less than five acres of fruit. Members have each a distinguishing mark, which is placed on the cases containing the fruit shipped by them. Any member found guilty of deception in the quality or quantity of fruit sold through the Association, or of his not using his registered distinguishing mark, or of selling, or disposing directly or indirectly, with knowledge of destination, of fruit at any place where an agent of the Association has been established otherwise than through the Association, is expelled from the Association, after his case has been duly investigated by the committee. Notice in writing is given each week by each member to the secretary, of the approximate quantity and description of fruit which any such member may be in a position to supply.

In 1906 New Zealand exported 230,930,041 lbs. of frozen meat.

In 1906 Argentina imported goods to the value of £53,994,104, an increase of over 31 per cent. over 1905. The exports amounted to £58,450,766, being a decrease of a little over 9 per cent. as compared with those of the previous year. The principal exports were:—Wheat, £18,312,236; wool, £11,680,554; maize, £10,673,137; hides and skins, £5,898,621; also linseed, frozen meat, wheat-flour, cattle. There is an increase recorded of over 14 per cent. in the value of maize exported in 1906 as compared with the previous year.



SOUTH AFRICAN PRODUCTS EXHIBITION.
A Glimpse of the Natal Court.

Maize Cultivation in South Africa.

WITH SPECIAL REFERENCE TO NATAL.

By E. R. SAWER, Director Experiment Stations.

STORING, HANDLING AND MARKETING.

At a time when Natal is seeking fresh outlets for a surplus of maize, a consideration of the means available for safeguarding and handling the crop to the best possible advantage will not be out of place. The organisation of an oversea export trade brings with it the necessity for many facilities in transport and shipping which must largely determine the margin of profit secured; and the loss of any available economy would seriously handicap an attempt to win for South African maize a place on the British and Continental markets. A cursory examination of the methods in vogue in the Americas and South Africa respectively disclose many discrepancies which call for explanation. In the New World the business of moving grain from producer to manufacturer or consumer has been developed to a high degree, and many useful lessons from this source might be exploited to our own advantage.

In the matter of production the South African farmer is at an advantage over the American. He has longer seasons for working, cheaper land and labour, and draught cattle which largely find their own living in place of horses requiring careful feeding in winter. And yet the latter can produce his maize, rail it a thousand miles to sea-board, ship it ten thousand miles by sea, and land it in Johannesburg at 10s. a muid. Such a result can only be possible where a perfect marketing system obtains, and it is upon the adoption of similar methods that the development of our own export trade must depend.

The American farmer labours under the further disadvantage of harvesting his crop in a moist climate, where it has been found difficult to air-dry maize sufficiently thoroughly to ensure its safe storage and carriage in bulk. With the exception of insect attacks of one sort or another, the one cause of deterioration of corn in that country is excessive moisture. Maize matures so late in the season over most of the area which produces a surplus, that there is not sufficient warm, dry weather to properly cure it, and the bulk of the crop usually goes into the crib damp and cold. Driers or kilns have therefore been widely adopted, by means of which heated air is passed through the maize until the superfluous moisture is removed. This process is in disfavour with the manufacturers, however, who claim that the heat injures the grain for their purposes, and, further, that the damage by cracking and breaking in subsequent handling is considerable.

In South Africa, on the other hand, a dry winter renders feasible

thorough air-curing with its accompanying advantage, granted always that every precaution is used to secure this result. Such being the case, it may be confidently stated that the successful and profitable export of maize from Natal depends upon, firstly, the further lowering of cost of production by the use of better machinery, selected seed and improved methods of cultivation; and, secondly, by perfecting an organised system of marketing.

CRIBBING.

No amount of field-curing will render maize fit for immediate shelling and storing, and in all cases the ears require to be stacked in a well ventilated crib to dry. New maize husked soon after maturity will contain as much as 20 per cent. of moisture, and in that condition will neither store nor carry safely. It is likewise unfit for feeding or milling until the water-content has been reduced to 12 or 13 per cent., and this is best effected by allowing it to remain on the cob for at least two months of suitable weather. The primitive practice of stacking the ears in the field cannot be too much deprecated. Such grain is at the mercy of mould, insects, vermin, and stray cattle, and may further suffer from the effects of unseasonable rains. It is generally at this stage in handling that the crop sustains more damage than at any other time. Satisfactory cribs in a number of types may be constructed to meet the requirements of individual growers. In all cases, however, the floor should be raised from the ground and be close enough to retain shelled grain, while the sides should be sufficiently open to allow of free ventilation while retaining the ears. At the Experimental Farm cheap cribs have been constructed from native and wattle poles with a galvanised iron floor, the sides being filled in with heavy woven fencing wire, behind which is finer poultry netting. A more elaborate structure may be built with wooden frame and lathe sides, a pair of cribs being arranged under a single roof with wagon way between. The husker and shredder is furnished with an elevator for carrying the ears to the crib, and these are later removed for shelling by way of a sliding trap fixed at the bottom of the crib. All forms should be provided with a roof, when the crop may be carried safely into the following rainy season, or until the market warrant a sale. Where such protection has been provided shelling should be postponed as long as possible, for the grain will in almost all cases carry over better on the ear than when binned or sacked.

GRANARY INSECTS.

No insects are more easily carried from place to place or more universally distributed than those commonly classed together as "weevil." In Texas it was ascertained by careful enquiry that there was at one time an annual loss of over 50 per cent. of the maize grown in that State destroyed by weevils and rats. We are not in a position to give any estimate of local loss from these causes, but it is sufficiently

serious to render practicable remedies acceptable, for not only is the weight of grain diminished by the ravages of the insects, but the residue is rendered useless for seed or consumption.

From the number of insects that occur in bins and granaries three species stand out as being particularly injurious, and are further distinguished by the fact that the larval stage is spent within the kernel of the maize. The Grain Moth (*Citotroga cerealella*) has been detected both in the field and the bin in several parts of South Africa. The eggs are laid either on the bin in several parts or when this has been harvested, and after a short time the caterpillars hatch out and burrow into the maize kernel, which they completely hollow out. Two or more of these may be found in each kernel of a badly infected mealie ear. The Rice Weevil (*Calandra oryza*), so called from the fact that it was first discovered in Indian rice, now attacks indiscriminately maize, wheat, rice, barley, and kafir corn. This form differs from the following in the possession of wings, as a result of which the eggs may be laid on the standing grain. It may be further distinguished by the presence of four distinctive reddish spots on the wing cases. The Granary Weevil (*Calandra granaria*), on the other hand, is essentially an indoor species, both larva and beetle living within the kernel of the maize, as a result of which habit the species has lost both wings and power of flight. The rapid multiplication of these insects is favoured by dampness and heat, and it has been estimated that the progeny of a single pair of weevils under such conditions may amount to eight or ten thousand individuals by the end of a single season.

STORING.

The deterioration of maize after harvesting may therefore in the vast majority of cases be attributed either to moisture or insect attacks. The "heating" or germination of grains can only ensue in the presence of moisture, warmth and oxygen, and when any one of these influences is absent, little damage will be sustained. The most modern bins or elevators take the form of air-tight tanks which are filled from above and then hermetically sealed. The maize is withdrawn as required from a tap or spout situated at the bottom of the tank. If thoroughly crib-cured the grain is thus safeguarded against atmospheric influences. In spite, however, of the most careful examination, eggs of the grain moth and rice weevil, and the larvae and pupae of these and other species concealed in the kernels may escape observation and survive the process of shelling and winnowing. The use of an insecticide is therefore always to be recommended, and nothing answers this purpose better than bi-sulphide of carbon, which is a nearly perfect remedy against granary insects and now widely adopted in South Africa. This substance is a colourless liquid with a strong, disagreeable odour. It volatilises quickly at ordinary temperature, is highly inflammable, and a powerful poison. It may be sprayed directly on the grain without injuring it for con-

sumption, as the poisonous principle is completely dissipated by vaporisation; but the most satisfactory method of employment is to place the liquid in shallow dishes or on pieces of cotton waste at the top of the bin. One pound of bi-sulphide will completely permeate five tons of loose grain, and, being heavier than air, sinks quickly through this, destroying all vermin which may be present. Where seed grain is being stored the treatment should be continued for 24 hours when no loss of germination will be entailed. Grain for milling may be subjected to the fumes for 48 hours without damage. Care should be taken that no naked lights be brought into the place until all the fumes have passed off.

THE ELEVATOR SYSTEM.

Labour-saving devices may play a very important part at every stage in the cultivation and handling of the maize crop, and reliance is placed upon the more general adoption of machinery as a means of considerably reducing the cost of marketing the grain. An extension of the areas under maize encouraged by a successful export will warrant a large implement bill, and co-operative purchase in many cases solve the difficulty of capital outlay. The maize harvester, husker and shredder and power sheller must ultimately find places in our system, and with them their complement as seen in the elevator. The latter device allows the cost of sacks and the handling of sacked grain to be eliminated from the marketing price which is in itself a consideration of no little importance. From the crib the ears are automatically tumbled by the power sheller, and the shelled grain fed into corn wagons. Drawn in these to the station or siding it is lifted through a carrier, driven by a four-horse-power oil engine, to a large storage bin or elevator. Weight of grain is determined in wagon and tare deducted, while loss from weevil and grain moth is obviated by regular fumigation with carbon bi-sulphide. From the elevator it is trucked by gravity and again at ship-side to the hold. Freight in bulk, by means of shifting boards, to the centre of consumption, the process is repeated, and from field to factory or mill no occasion has arisen for the use of sacks, while the saving in handling costs has been very considerable.

COMMERCIAL GRADING OF MAIZE.

Whatever system of inspection be adopted two classes of factors will have to be considered. Firstly, those indicating *condition*, such as water-content, mould, rot, etc., and the percentage of broken kernels, dirt, and other foreign matter; and, secondly, those which serve as an index to *quality*, such as colour, plumpness, proportion of starch in grain, and size of germ. In actual practice four factors are employed in all cases for the determination of the grade of a cargo of maize, which admit of measurement with reasonable accuracy and speed. These are: (1) Moisture; (2) percentage of colours in mixtures; (3) percentage of damaged grains; and (4) the percentage of broken grains and

dirt. The following are the rules for grading maize recommended by the Chief Grain Inspectors' Association of the United States for adoption by the trade organisations and commissions which control the inspection departments:—

No. 1 Yellow Corn shall be pure yellow corn, sound, plump, dry, sweet, and clean.

No. 2 Yellow Corn shall be 95 per cent. yellow corn, dry, sweet, and reasonably clean, but not sufficiently sound or plump for No. 1 Yellow.

No. 3 Yellow Corn shall be 95 per cent. yellow corn, reasonably dry, reasonably clean, but not sufficiently sound and dry for No. 2 Yellow.

No. 4 Yellow Corn shall be 95 per cent. yellow corn, not fit for a higher grade in consequence of being of poor quality, damp, musty, or dirty.

No Grade Yellow Corn. (See general rule.)

No. 1 Mixed Corn shall be mixed corn, sound, plump, dry, sweet, and clean.

No. 2 Mixed Corn shall be mixed corn, dry, sweet, and reasonably clean, but not sufficiently sound and plump for No. 1 Mixed.

No. 3 Mixed Corn shall be mixed corn, reasonably dry, reasonably clean, but not sufficiently sound and dry for No. 2 Mixed.

No. 4 Mixed Corn shall be mixed corn not fit for a higher grade in consequence of being of poor quality, damp, musty, or dirty.

No Grade Mixed Corn. (See general rule.)

No. 1 White Corn shall be pure white corn, sound, dry, plump, sweet, and clean.

No. 2 White Corn shall be 98 per cent. white corn, dry, sweet, reasonably clean, but not sufficiently sound and plump for No. 1 White.

No. 3 White Corn shall be 98 per cent. white corn, reasonably dry, reasonably clean, but not sufficiently sound and dry for No. 2 White.

No. 4 White Corn shall be 98 per cent. white corn, not fit for a higher grade in consequence of being of poor quality, damp, musty, or dirty.

No Grade White Corn. (See general rule.)

No Grade—General Rule.—All grain of any kind and variety that is wet, hot, or in a heating condition, burned or smoky, contains weevil, or is for any reason unfit for warehousing, shall be classed and graded "No Grade."

INSPECTION DEPARTMENTS.*

In five of the United States of America grain inspectors are directly responsible to the State, or work through a board of railway and warehouse commissioners or through a special commission. In other cases they are managed by the trade organisation independent of any outside control. The question of administration is a local and unimportant one, so long as the department is adequately staffed and equipped. It

* *Vide* Bulletin No. 41 B. of Plant Industry: U.S. Dept of Agriculture.

can be supported by small fees as soon as a considerable trade has come into existence, for cost of maintenance is very small.

The apparatus required for determining the four factors under consideration consists simply of an oven or air bath, balance, sieves, small mill and a set of aluminium pans.

"For determining the moisture a small sample of maize should be ground into a coarse meal. If the maize is ground too fine it becomes heated during the operation, and there is a consequent and irregular loss of moisture. After grinding a definite quantity of the sample, it should be weighed out in one of the aluminium pans. The larger this quantity the less the percentage of error in weighing is likely to be. However, for quick work the sample must not be too large. Twenty or thirty grams has been found a convenient amount to use. This weighed quantity, which for convenience of reckoning should be an even weight, either 20 or 30 grams, is then placed in the air-bath, which has been previously heated to about 102 degrees C. (215 degrees F.) This temperature is slightly above the boiling point of water and will quickly evaporate the moisture, and after subsequent weighing the percentage of loss may be determined. Theoretically, the sample should be dried until repeated weighings would show no further decrease in weight, but for practical purposes, where the element of time required for making this determination is important, a shorter time will suffice. It has been found by numerous experiments that the amount of moisture which a sample of coarsely ground meal will give up during two hours' drying at 102 degrees to 105 degrees C. (215 degrees to 221 degrees F.) is about $1\frac{1}{2}$ per cent. less than the total amount of moisture contained, so that for commercial purposes two hours' drying at the above temperature will yield results from which the total moisture can be estimated with sufficient accuracy for general work. It is necessary, however, to extend this time to three hours on days when the atmosphere is especially damp. Whenever immediate results are not absolutely necessary, it is much safer and more satisfactory to dry the sample completely; that is, to dry it until repeated weighings show no further loss. This commonly requires twelve to sixteen hours. After the samples have been dried they should be weighed again with all possible speed, as the meal readily absorbs moisture from the atmosphere upon being removed from the air-bath. It is best in all cases to make duplicate moisture determinations, as errors are likely to be made by even the most careful workman. These duplicates should be made from separate grindings of different portions of the sample. Where the results of the two determinations in the short-time drying differ by more than about 1 per cent., a third determination should be made.

"The percentage of colour may be determined by simply counting out the number of kernels of each colour in a fair average sample. At least 500 kernels should be used as a basis of reckoning.

"The percentage of damaged grains is determined by counting over the number in a fair average sample of at least 500 grains and reckoning the percentage of the number present. The damaged grain is considered to include all cob-rotten, bin-burnt, mouldy, or otherwise unsound kernels.

"The determination of broken grains and dirt should be made on the basis of weights; that is, by weighing out a definite quantity of maize and separating by means of the sieve mentioned above and by subsequent hand-picking, all broken grains, meal, dirt, chaff, and foreign material of whatever nature. This determination should be made on a reasonably large sample of maize—at least a kilogram (2·2 pounds). Where large scales are not at hand it is sometimes convenient to use the ordinary chondrometer or brass bucket employed in making the test weight per bushel of wheat, and the siftings and pickings may be weighed on the small balance used for the moisture work, and the percentage reckoned."*

With a knowledge of the standards adopted and methods employed at the point of inspection, growers would be in a position to determine prior to shipment whether consignments were in suitable condition and quality to merit acceptance in one or other of the recognised grades.

(To be continued.)

Agricultural Statistics.

THE NEED FOR THEIR COLLECTION.

By H. J. CHOLIS, F.S.S.

EVERY individual is a factor in the State; and his importance as a factor increases with the productiveness of his activity—mental or otherwise—over and above his mere existence as a social unit.

In a new and healthy country, it is obviously the agriculturalist who contributes in the greatest measure to the setting of money in circulation. His efforts result in the conversion of materials for which, by their very nature, there is no general demand, into products which are readily convertible into money. It follows, then, that the prosperity of a new country is dependent upon the state of its agriculture.

Further, the more independent a country is of foreign sources of supply for the necessities of life, the greater will be its prosperity; for it means that money that would otherwise be sent out of the country for the purchase of goods will be kept at home. Also, increased production

* Ibid: p. 17.

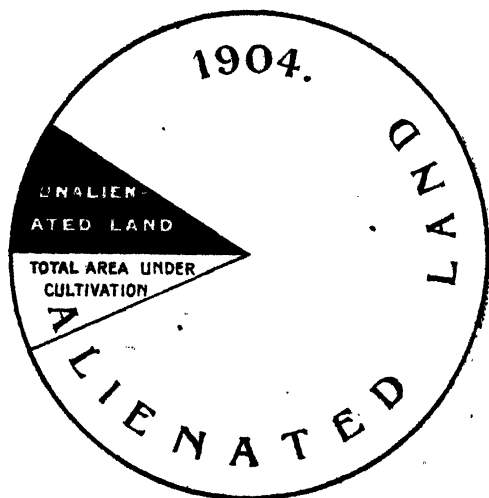
beyond the requirements of the producing country permits of export, thus bringing more money into the country. Again, the circulation of more money means the raising of the standard of living and the increased power of individuals to purchase luxuries, and goods not coming under the category of necessities of life.

A little reflection will make it clear that, in order to judge of a country's progress from year to year, some method must be adopted of gauging: (a) its production; (b) exports; and (c) imports.

Statistics are admittedly the most convenient and the nearest possible approach to an accurate means of studying a country's growth. No amount of verbal description, for example, will convey the same idea as that gained by a glance at such a statement as this:—

Land alienated (Natal, 1904)	11,486,846 acres.
Land cultivated (total)	729,712 acres.
Land unalienated	1,071,437 acres.

Diagrammatically, it is even more significant* :—



Statistics of exports and imports are compiled by the Customs, and are published (in South Africa) monthly, quarterly, and annually. For the present, however, we may leave these statistics out of consideration, and deal with those more concerning the farmer—those relating to agriculture.

In every civilised country statistics of agriculture are collected, and the method adopted in Natal may be briefly described.

Two forms are sent to each individual farmer by the Department's

* There is no need to expatiate upon the state of things indicated by this diagram—the percentage of total area under cultivation to the whole area of alienated land. The facts are now fairly generally recognised, and the question involved is getting some share of the attention it needs.

collectors, with the request that they be filled in as accurately as possible. Farmers have then the option of posting the returns direct to the head office of the Department of Agriculture, or handing them to the collector. The first of these forms embodies information relating to the acreage under each of the various crops and the produce obtained therefrom, numbers and description of live stock and agricultural implements and machinery, and quantity and description of animal produce. The second of the two forms is a special one for enabling the Department to arrive at the average yield per acre of each of the principal crops for each Magisterial Division.

Arrived at the head office, the figures on these two forms are compiled and totalled for each of the Magisterial Divisions of the Colony, and are finally published, after careful comparison with the previous year's figures, in the "Statistical Year Book."

Statistics relating to Natives and Indians are also collected, but for these entirely different forms are used.

Everything is treated as strictly confidential—both by the Department's collectors and by those officers of the Department whose work it is to compile from the returns. Once the figures are entered on the compilation sheets, their individuality is lost, and it is impossible to know to what farm any particular line of figures relates without referring to the numbered lists supplied by the collectors. The returns themselves are kept a year and are then burnt.

Many farmers in this country have the impression that the statistics are collected, partly, if not wholly, for taxation purposes. There is not the slightest foundation for this idea. The writer, under whose charge the collection, compilation, and publication of these statistics come, is in a position to state definitely that the results obtained year by year are used for no other than purely statistical purposes. The figures are found invaluable—and are, indeed, indispensable—for studying the growth of the country; and, read in conjunction with the Customs statistics, they throw a great deal of light upon the position of the country, economically and otherwise, in any given year.

In addition to the publication of the statistics each year in book form, many inquiries are received by the Department for statistical information upon specific points, from banks, commercial houses, consular agencies, and private individuals; and it is safe to assert that the furnishing of such information leads in a great degree to an extension of trade in various lines, such as would not take place otherwise. Most of the inquiries that are received are naturally more or less of what may be termed a selfish nature, but it is a common axiom that trade begets trade, and the advantages are eventually mutual. Thus farmers, by supplying statistical information, contribute in a certain measure to the general prosperity of the country, and they themselves are among the first to derive some of the benefit accruing.

Ascending from the discussion of domestic reasons in favour of the compilation of statistics, we come to higher arguments that must not be, though they too often are, overlooked in such discussions.

Natal is not an independent State, and consequently has certain obligations to fulfil towards the rest of the Empire to which she belongs. All our statistics—dealing with production, agricultural and industrial, commerce, interchange, finance, population, etc.—are included, in a summarised form, in the *Statistical Abstract of the British Empire* and other publications issued by the Imperial Government. It is necessary that they should appear in such publications—which are used by all students of the world's statistics. Natal is a small country, but her importance as a part not only of South Africa but of the Empire itself is increasing year by year concurrently with the development of her agriculture and industry and accompanying commerce. A production of approximately three million bushels of maize, of over half a million hundredweights of sugar, of a million and a half pounds of tea, a wool clip of nearly two million pounds, and a position as the leading wattle-growing country of the world with an output of fourteen thousand tons, furnish figures sufficiently large to affect the totals for the Empire.

How many people recognise that it is the *duty* of a country to furnish as complete statistics as lie in its power to collect and compile—its duty, in the case of a Colony, to the rest of the Empire to which it belongs; in the case of an independent country, to the rest of the world? Moreover, it is the duty of each generation towards ensuing generations to provide the fullest possible details, not only of occurrences of a purely historical nature, but also of the progress of the country from year to year. History without statistics is as a man without backbone. When the history of these times comes to be written, it may not be found to be bristling with formidable arrays of figures, but the accurate narration of facts dealing with a country's progress will depend largely upon the study of all available statistical records.

Agricultural statistics are found invaluable by the Department of Agriculture in the study of individual crops—particularly such as are being tried experimentally or for the first time. As is well known, cotton did well in Natal years ago. Thus, in 1865 we find that there were 1,361 acres under cotton, and that the production was 294,728 lbs. The cultivation of this crop gradually diminished until, forty years later—in 1903-4—there were only 16 acres cultivated, yielding 1,500 lbs of cotton. Then came a revival of interest in this crop. Much was written and said about Natal's suitability for cotton, and many decided to experiment. In 1903-4, as has been stated, the area under cotton was only 16 acres. In 1905 the acreage had increased to 157. The production was, of course, practically nil. A glance, however, at some of the 1905-6 returns (which are in process of compilation) shows that

a good deal has been done, and the total yield promises to be gratifyingly high—considering the experimental nature of the cultivation.

Another crop that may be alluded to as an example of the necessity for statistical information is fibre. Aloes have been cultivated in Natal for many years, but, as is shown by the statistical returns, interest in the production of fibre has until quite recently been very feeble. In 1902 the production was only 12 tons; in 1904 it was 90 tons. Interest in this and allied crops is being awakened, too, and in two or three years we may expect to see large increases in the production of fibre.

Coffee is another crop on the progress—or lack of progress—of which our statistics throw much light. A quotation from the last Annual Report of the Secretary, Minister of Agriculture, will show the position of this crop in our agriculture:—

“A study of the statistics of the cultivation of coffee in Natal shows a gradual decrease in the amount produced, and at the rate at which interest in its cultivation appears to be dwindling, it will not be long before the produce is nil. In 1896, the amount of coffee produced in Natal was 35,252 lbs., valued at £1,700; whilst last year (1905) the production was only 9,189 lbs., worth £498. The area under coffee in 1896 was 322½ acres, whilst last year it was 260 acres. There was, however, a greater area under coffee last year than in the preceeding year—when there were 147½ acres cultivated.” In 1854 coffee appears to have been tried for the first time, when 41 acres were planted. In 1856, 105 acres were under crop, and the production was 2,000 lbs. In 1859 the production had increased to 20,670 lbs.; in 1862 it was 33,714 lbs., the following year 51,367, and in 1864 it stood at 61,964 lbs.

The necessity for the annual collection and compilation of agricultural statistics, even from the one point of view of the study of the progress of various crops, will thus be evident. A series of statistical records, such as exist from about the year 1850, is the only reliable means that the Department has of watching the various crops of special interest. Statistics and information of this nature can only be obtained by a system of annual returns: were the returns made at longer intervals or not at all, we should have to rely on hearsay or guesswork. Individual reports, whilst valuable in certain directions, furnish no basis upon which such a statistical estimate can be made as the Department needs.

It would be impossible to deal, in a short paper such as this, with the various uses to which the statistics are put, but the foregoing will furnish some indication of their value to the Department and so to the country as a whole.

After this discussion of some of the arguments in favour of the collection and publication of statistics, the writer may perhaps be permitted to put in a personal plea for the exercise of greater care on the part of those who fill in the forms issued by the Natal Department of

Agriculture. Many of our farmers are models of carefulness in filling in their forms, and it is a pleasure to compile from their figures; but others are sadly wanting in the most ordinary amount of care, whilst others still—a very few, fortunately—seems to deliberately misrepresent their position. The effect of such badly filled-in returns as these upon the mental organisation of the officers entrusted with the work of compiling from them, is disastrous; and, indeed, the problems involved in some of the returns are highly intricate and often defy all attempts at elucidation. The exercise of an ordinary amount of care on the part of those filling in the forms would obviate much trouble and loss of time in the head office.

- In conclusion, we may quote from Prof. A. L. Bowley's work on *The Elements of Statistics* (the italics are our own):—

"The most important function of statistics is to produce evidence showing the relation of one group of phenomena to another; for *the information obtained is presumably intended as a guide for action*, the guidance is generally needed to show what actions are likely to produce certain desired effects, and this is best investigated by finding how such effects have been produced in the past. We have then to determine whether changes in one measurable quantity (*e.g.*, the duties on corn), have produced changes in another (*e.g.*, the amount of pauperism), a problem generally insoluble, but one on which most light can be obtained by the study of the relevant statistics in the light of mathematics, the mathematics of probability."

CAPE AGRICULTURAL UNION.—The Cape Agricultural Union commenced its annual session on the 15th May at Port Elizabeth.

CHIEF LOCUST OFFICER.—The *Natal Government Gazette* of the 30th April notifies that His Excellency the Governor in Council has been pleased to appoint Mr. Claude Fuller, under the Locust Extermination Act, 1904, to be Chief Locust Officer, with power to administer the Act, with effect from the 19th March, 1907.

DELAGOA TAX ON TOBACCO.—According to a Reuter's telegram in the daily Press early in May, the Administrative Council at Lourenco Marques approved of the municipal decree enforcing a tax of 500 reis, equal to 2s., per kilo on all tobacco entering the town limits for consumption, excepting the products of the local factory using Mozambique leaf.

Land Banks versus Credit Banks.

By E. T. MULLENS, Secretary, Minister of Agriculture.

REFERENCE was made in an article which appeared in the March issue of this *Journal* to a pamphlet which has been circulated broadcast by the Treasury of the Cape Colony on the subject of Land Banks. In a series of articles which appeared in the *Natal Witness* last month, Mr. G. R. Richards reproduced the facts set forth in the Cape pamphlet; and, as the question of the establishment of an Agricultural Bank for Natal is being widely discussed, I should like to make clear the distinction between Land and Credit Banks. I dealt at some length on the same subject in an article which appeared in the October and November, 1905, issues of the *Agricultural Journal*; and those desiring detailed information regarding the Continental Land and other Banks will find the same there set forth. I now only propose to deal with the two principal divisions of Agricultural Banks, viz., Land and Credit Banks, concerning which some confusion appears to exist in the minds of those writing thereon to the Press.

LAND BANKS.

A Land Bank, as its name implies, is a separate banking establishment dealing solely with advances on the security of freehold land. Such a system of banking cannot, with any degree of success, be worked by a Government Department. There must be a separate directorate, management, and a central bank, with or without branches according to circumstances. The simplest form of Land Bank is that where advances are made on first mortgage of freehold land, the same margin of security being required as would be necessary in the case of any ordinary bank, and sometimes even a greater margin of security being insisted upon. No second mortgages are entertained. The more usual course is for the money to be repaid automatically by fixing a higher rate of interest than that required to cover the working expenses of the bank. For instance, should a rate of 5 per cent. be sufficient to cover the interest which the bank itself has to pay and the working expenses of the bank, then a rate of 7 per cent. or 8 per cent. would leave 2 per cent. or 3 per cent., as the case may be, to go towards a sinking fund which in a period of from 30 to 60 years, as the case may be, would wipe off both the interest and the original loan. This system from its simplicity is preferable to almost any other. Where the Land Bank is a Government one, or under Government control, special legislation is necessary, and such legislation generally includes special provisions regarding mortgage bonds entered into with the bank. In some cases, the bank is empowered to enter into the mortgage bonds with the payment of nominal

or at any rate less fees than required in the case of ordinary mortgages, the State foregoing a portion of the taxation in view of the profit derived from the transaction, for, if the bank is worked on the strictly business basis on which it should be, there cannot be any losses. The history of the Australian banks shows that the losses are comparatively trivial. Some Land Banks raise their funds by means of bonds held by the public generally, the position then being that, instead of an individual having a mortgage over a particular property, he has a bond on the general security of the bank, which is readily negotiable in the open market. This would not be practicable in Natal. In my original articles, I strongly recommended that, if there was to be a Land Bank, there should be a general one for the whole of South Africa, of which one branch should be situated in Natal. It would be necessary to raise a special loan for the purposes of the bank, and if the loan were raised on the security of the whole of the South African Colonies, better terms would be obtained from the lenders, as the security would be excellent. Then, again, there would not be the duplication of management which would be inevitable were there separate banks for each of the Colonies. Still again, the chance of political influence would be nil in the case of a bank with one central directorate to which all the local branches were responsible, and the decisions of that central directorate would be far more likely to be impartial than in the case of a local bank where private influences might be exercised. It is extremely difficult to estimate what would be the amount required for a Land Bank for Natal, but it is certain that if each Colony had its own bank, the total amount of capital must necessarily be far greater than would be the case with one central bank. There are about 4,000 farmers in Natal, every one of whom would be eligible to apply to the bank for a loan—provided his character were good.—Supposing only one half were to apply and that the average loan were £500, then £1,000,000 capital would be required. Were we working with a combined South African bank, however, probably we should be justified in reckoning only half of that amount for Natal itself, as in a few years the repayments would amount to a considerable sum. If urban properties were considered eligible, then the capital would certainly have to be raised to £2,000,000 for a local bank. In view of the work entailed in connection with the issuing and collecting of loans, registering and dealing with first mortgage bonds, etc., I think the necessity for a separate banking organisation managed by men with banking experience is evident.

CREDIT BANKS.

Land Banks only meet the cases of those who are lucky enough to have freehold property on which the necessary margin can be given, but would not assist those who are already mortgaged up to the hilt, unless they can arrange a second mortgage elsewhere for the balance,

and will certainly be of no assistance to those who have no landed security to offer. To meet the case of tenant and other farmers, Agricultural Credit Banks exist in other countries, many of which are only banks in name, and would more correctly be described as mutual loan societies. They are worked on many different principles, and some of the most successful are worked on the system of personal credit. In credit banks the expenses of management are generally very small. The Land Board has already made the suggestion that it be empowered by Parliament to assist in the establishment of Credit Banks, and, if the power be given, the mode of procedure would probably be that the district desiring the establishment of such a bank would approach the Board for a loan of £1,000 or £2,000. This the Board would grant to the district on the individual and collective responsibility of, say, half-a-dozen trustworthy men. The responsibility of the Board would cease with the handing over of the loan to the men in question, and those men would be personally liable for the repayment of the loan to the Board within a certain specified time with interest at, say, 5 per cent. These men in their turn would consider the individual needs of their district, lending small sums here and there to men of known probity for reproductive purposes, keeping a strict watch over the purposes to which the individual loan was put on account of the fact that any loss would be their loss and not that of the Land Board. The only expense incurred would be the salary (nominal) of a local man to keep the books for the local committee, so that 1 per cent. more than the Land Board charged would cover the working expenses of the local committee and form a fund out of which to repay the original loan. I have frequently been met with the objection that such a system will be impracticable in Natal as it would be impossible to find men willing to take those risks. Were that really the case, then the public spirit and honour of Natal would be low indeed; but I do not believe that such is the case, and am confident that, when the system comes to be thoroughly understood, it will work here as it has already so successfully worked elsewhere. It is no theoretical or visionary scheme, but one which, with modifications requisite to meet the various local conditions, has already successfully transformed many a poverty-stricken district. It is founded on self-help and personal honour. In times of war, plague and famine, you have men voluntarily coming forward and working without remuneration on boards and committees for the public benefit, taking financial and personal risks, then why not in times of financial distress expect men to be equally as ready to offer their services to relieve their less fortunate fellows? It is only because the principle is not yet understood that the system has not been inaugurated in Natal, but, given the opportunity, the men will come forward. I already personally know of one case in Natal where some half-a-dozen public-spirited men were prepared to go security for a sum with which to start a local credit bank, but the

scheme could not be gone on with on account of want of legislative authority. It would be impossible for a Land Board or for the Government to deal with individuals all over the Colony in the case of small loans, and the only practicable solution of the difficulty is that of working through voluntary local committees. Each committee can adopt its own system. They can insist on shares being taken in a local credit bank by those borrowing, they can insist on security on crops or on the borrower having two personal sureties, or they can merely lend money to individuals on personal character, as they please, so that there is every scope for the exercise of local benevolence consistent with the fact that, whatever happens, the committee themselves are personally liable for any losses they may make by injudicious lending. That is the safeguard of the whole system—personal responsibility. The borrower knows that, if he does not play fair, he is not doing the Government down, but is doing down men who voluntarily took personal risks on their own shoulders to help him; and it is a pretty mean sort of man with whom that fact will not have considerable influence. There is no charity about the concern. It is on a strictly business basis. The original amount lent has to be repaid within a definite, specified time, with interest; those borrowing locally have also to repay their amount within a definite, specified time with still further added interest; and, if the local banks are worked properly, the result usually is that, not only is the original amount returned in full to the Government, but that in the course of time a reserve fund is built up from which future loans are made, and that the credit bank becomes a popular local savings bank into which farmers and others put their savings with full confidence that they will be used for the benefit of their own district and returned with interest in due course.

LAND BANK.—The question of introducing legislation for the establishment of a Land Bank is being considered by the Cape Colony, the Transvaal, and by Natal. It is to be hoped that the Bill introduced by each Colony will contain provisions authorising joint action with any other Colony concerned so that, should some practicable scheme of a central Land Bank be formulated, it may be put in hand without having to approach each legislature for an authorising Bill. The Acts already in existence and operation in the various States of the Australian Commonwealth should form a good basis upon which to found an Act suitable for South Africa.



SOUTH AFRICAN EXHIBITION.
Another View of the Natal Section.

Co-Operatie.

Doór E. T. MULLENS, Secretaris, Landbouw Ministerie.

DE eerste mensch deed alles voor zichzelf, dat wil zeggen wanneer er iets te doen stond, dat in den regel maar zelden was. Hij vergaderde kiezelsteen, kapte ze, bond ze met riemen aan stukjes hout; en alzoo maakte hij zich strijdbijlen, messen, en gereedschap. Voor kleeren—die hij droeg meer als een sieraad dan ter wille van warmte of welvoegelijkheid—wierp hij om zich huden en vellen van gedoodde dieren; en, voor een woning, bouwde hij zich met eigen handen ruwe hutten uit takken, bast, gras of huden, naar eisch van de omstandigheden; of anders kroop hij in spelonken of holen in de bergwanden gedolven, met pikken gemaakt van de hoorns van den eland en het rendier. Dit was de eeuw van uiterst individualisme of afzonderlijkheid wat de werkkrachten betrof—de eeuw toen de edele wilde vrij in de bosschen rondliep—de wilde met verfoeielijke gewoonten en moorddadige instinkten, over wien het eens de mode onder de dichters was om dol te worden. De onbeschaafde vond soms, echter, dat wanneer hij een overloed van vleesch had als gevolg van de jacht, hij zich de moeite van wapens voor hemzelven te maken kon besparen door een deel van het overschot der jacht te verruilen voor wapens door anderen vervaardigd; en hij die een overvloed van vervaardigde kiezelsteen had vond dat hij zich de moeite van jagen kon besparen door zijne kiezelsteen te verruilen voor de produkten der jacht. Op deze wijze konden de wilden hunne luiheid botvieren en terzelfder tijd de vruchten van den arbeid van anderen genieten; en, daar deze ruiling populair werd, ontstond er trāpsgewijs een stelsel van ruilhandel dat het begin was van wat men “instinktieve of onbewuste co-operatie” kan noemen.

Stadigerwijs heeft de eerste mensch en toen de onbeschaafde dus de geheele fabriek van de moderne maatschappij opgebouwd, die gegrond is op co-operatie—niet bewuste, verstandelijke co-operatie, maar onbewuste gedwongen co-operatie van de soort die de dichter er toe bracht om uit te roepen dat zaken in het zadel waren en het menschedom bereden. Beschouw, bij voorbeeld, den huidigen vorm van onbewuste co-operatie noodig tot, zeg, het maken van een speld of een pen, dat geheel door machinerie gedaan wordt en de co-operatie vereischt van zoovele personen om het voltooid artikel te produceeren; of beschouw, bij voorbeeld, het aantal personen door wier onbewuste co-operatie een brood gemaakt moet worden voor het op uwe tafel gelegd wordt. Eerst moet de grond bereid worden voor bebouwing, en om dit te doen zijn ploegen en eggen noodig, in het maken waarvan, beginnende bij de mijnen en eindigende met het spoorweg vervoer, de diensten van talloze menschen

gegeven moeten worden; dan zijn er het boerderij volk die de groeiende-koorn moeten verzorgen, de aanvoerders naar het molen; degenen die den wagen, enz., maakten voor de karweiers; de molenaar, zij die de machinerie voor den molenaar vervaardigden en de oprichters van het molen; de koopman, en degenen die hem zijn winkel en kantoren bouwden en die hem helpen zijn zaak drijven; de bakker, en degenen die zijn gebouw en de ovens bouwden; en de handhavers van wet en orde, die al deze personen in staat stellen hun werk vreedzaam en in veiligheid te verrichten.

Het aantal personen die onbewust bijdragen tot het produceeren van zelfs het geringste artikel voor ons dagelijksch gebruik is bijna onbegrijpbaar; en het is slechts co-operatie die ons in staat gesteld heeft den toestand van beschaving of semibeschaving te bereiken waarin wij thans verkeeren.

De mensch, echter, let gedurig op en bestudeert de wetten die het heelal beheerschen en dan zoekt hij gedurig die wetten tot zijn eigen nut verstandelijk toe te passen. Door de wetten die de stoom en electriciteits krachten beheeren te bestudeeren en waar te nemen zijn wij in staat geworden die krachten tot onze dienaars in plaats van onze meesters te maken. Co-operatie zooals gewoonlijk aangewend onder het stelsel van ons moderne gezelschap maakt slaven van den mensch en verguist zijn ziel zoo dat hij wordt beschouwd zoo te zeggen als deel uitmakende van de machinerie die hij controllert en niet van veel meer beteekenis. De optand tegen dezen staat van zaken leidt ons tot socialisme en regeringloosheid; en doet prominent de kwestie verrijzen of wij ons zullen laten meesleuren met den stroom zonder te willen zien waarheen wij gevoerd worden, dan wel of wij het roer zullen grijpen en pogen onze koers verstandig langs den onstuinigen levensstroom te zetten. Eene studie van de wetten van onbewuste co-operatie toont aan dat wij de macht hebben co-operatie verstandig te kunnen wenden tot ons eigen voordeel; en dit is wat nu gedaan wordt onder wat men het nieuwe stelsel van co-operatie mag noemen.

Om niet te veel bijzonderheden aan te halen—de oorsprong van het nieuwe stelsel van co-operatie is deze *gedachte* geweest, nl. dat terwijl wij gedwongen zijn door de vereischten van de huidige maatschappij om te co-opereeren (samen te werken) ter voorziening van onze dagelijksche benoodigdheden, waarom dan niet op zoodanige wijze co-opereeren dat wij allen een evenredig gelijk deel der voordeelen van zoodanige co-operatie zullen oogsten in plaats van de tusschen-personen (makelaars) en kapitalisten toe te laten datzelfde stelsel van co-operatie aan te wenden om zich buitengemeen te verrijken op onze kosten. Co-operatie van deze nieuwe standpunt werd eens door Robert Owen en andere enthousiasten gepredikt als een leer die de wereld zou vervormen; en ik zelf geloof dat deze verstandige co-operatie *zal wel* blijken een der factoren te zijn tot hernieuwing van de wereld. Even als, in de

oude tijden, het Christelijke geloof zich spreidde en een succes bleek onder het gewoon volk, tot het zich doordrong tot de regeerders van die dagen; zoo verspreidt bewuste co-operatie zich thans onder het gewoon volk en dringt zich al hoe meer op de aandacht der bestaande overheden. De zedelijke opheffing daardoor van sommige gemeentes eertijds op het Europeesche Vasteland beschouwd als bestaande hoofdzakelijk uit leegloopers en dieven is haast wonderbaar.

Onder ons huidige stelsel van onbewuste, gedwongen co-operatie, geeft het bezit van kapitaal den eigenaar daarvan buitensporige voordeelen. De arbeider wordt een deel van de machinerie met geen ander rechten dan de machines zelf, en even onderhevig aan ter zijde zetting wanneer door ouderdom versleten of door een ongeluk beschadigd. Zijn aandeel in de opbrengst van zijn arbeid is beperkt tot het loonbedrag dat hij van zijn patroon kan afdwingen; en het komt er niet op aan hoe buitensporig de profijten zijn het geheel komt aan het kapitaal. Bewuste, verstandige co-operatie stelt den arbeider in staat om het kapitaal te huren waardoor het kapitaal tot dienst wordt in plaats van tiraan te zijn. De vereeniging van een aantal eerlijke vertrouwbare mannen stelt hen in staat hun gezamenlijk karakter en al hunne middelen (gering enkel, maar aanzienlijk gezamenlijk) als securiteit voor kapitaal te bieden. Dit kan tegen een vaste rente koers verkregen worden, hetgeen de huur daarvan voorstelt. Wanneer de huur betaald is, blijft de rest van de schoone profijten beschikbaar voor distributie onder de arbeiders.

Hier wil ik een duikelijk verschil toonen tusschen eigenlijke co-operatie en Aandeel-vennootschappen (joint stock companies) waaromtrent er veel vaagheid in de gemoederen van Natalsche boeren schijnt te bestaan. De neiging tegenwoordig is niet om ware co-operatieve genootschappen te vormen, maar om al meer over te hellen tot aandeelenmaatschappijen. Een aandeelen vennootschap is eene organisatie waarin het ieder vrijstaat aandeelen te nemen, hetzij boer of dorpeling, hetzij hij belang heeft in zekere nijverheid of niet, en het wordt gewoonlijk beschouwd als een geldbelegging—hoe grooter de dividend verdiend des te beter. In het begin stellen waarschijnlijk allen of bijna allen belang in de zuivel maatschappij, fabriek, of wat ook begonnen wordt; maar vroeg of spa wordt het onvermijdbaar dat de aandeelen overgaan in de handen van degenen die dividend zoeken—hoe meer hoe beter. De belangen der aandeelhouders worden dan niet die van de leveranciers of arbeiders, en in plaats van een kapitalist die zijne bedienden het zweet uittapt en die al het mogelijke eigen voordeel zoekt van degenen van wie hij koopt, ontstaat er dikwijls een nog erger positie, want de bestuurders der compagnie zijn gewoonlijk bedienden en onderhevig aan ontslag als zij niet zorgen aan den eisch om meer en meer profijten te voldoen. Het is overbekend dat compagnies hebben geen zielen die vervloekt kunnen worden noch lichamen die men schoppen kan; en sommige van de ergste patroons zijn aandeelenmaatschappijen. De oprichting van

aandeelen-vennootschappen kan aanbevelingswaardig zijn in gevallen waar zulks de eenige wijze is om kapitaal te krijgen—beter een of ander vorm van nijverheids co-operatie dan hoegenaamd geene; doch, waar mogelijk, is het de plicht van een landbouw departement om de vorming van co-operatieve inrichtingen aan te bevelen en aan te moedigen.

De echte co-operatieve vereeniging is die waarin de belangen van allen een zijn. Het kapitaal wordt gehuurd tegen een vaste en lage rentekoers; buiten de aanspraak op de ontvangst van de vastgestelde interessen, (die redelijk en nooit te boven gegaan moeten worden), hebben de aandeelhouders, die gewoonlijk beperkt worden tot de eigenlijke leveranciers aan of afnemers van de vereeniging, als zoodanigen geen andere. Na betaling van de interessen op het kapitaal en eenige voorziening van een reserve fonds, worden de netto profijten in drie of vier deelen verdeeld, waarvan de evenredigheden kunnen verschillen naar gelang van omstandigheden, doch behooren altijd zoo veel mogelijk gelijk te zijn. Een gedeelte komt de leveranciers (in het geval van zuivel zaken enz.) ten goede; een tweede gedeelte wordt aan de klanten of verbruikers (d.w.z., degenen aan wie de goederen of het werk geleverd wordt) gegeven; en het derde gedeelte wordt aan de arbeiders betaald. Soms wordt een vierde gedeelte besteed op het daarstellen van fondsen tot voorziening van de kosten van ziekte, pensioenen voor ouden, of van algemeene milddadigheid of publieke doeleinden. De belangen der leveranciers worden natuurlijk verzekerd door het aandeel hen in de profijten geboden; hoe meer zij leveren hoe meer hunne profijten. De belangen van het publiek worden verzekerd door hun deel in de profijten: hoe meer zij van deze bijzondere vereeniging koopen, hoe grooter het bedrag ten crediete van hen ten einde van het jaar. Hoewel wij voorbeelden van co-operatie in Natal hebben waar de belangen van beide koopers en verkoopers op deze wijze verzekerd zijn, moet ik nog vernemen waar er een bestaat die de belangen der arbeiders ook alzoo verzekert. Toch, wanneer alles gezegd is, wie kan zoo zuinig werken en over het algemeen goede zaken bevorderen als tevredene werkers? Het toezeggen aan de arbeiders van een aanspraak op een gelijk deel van de profijten is meer dan een zaak van rechtvaardigheid; het is een gezond bezigheids beginsel op ondervinding gegrond; en tot de arbeiders hun deel van de profijten verkrijgen, zullen wij nooit dat succes in co-operatie bereiken waarvan al hare oorspronkelijke bevorderaars droomden, en die ik persoonlijk meen zij kan bereiken.

Het industriele duizendjarig rijk, waardoor natuurlijk bedoeld wordt het nijverheids ideaal, dat teweeg gebracht zal worden door zoodanige co-operatie, is makkelijk te begrijpen wat een schets daarvan betreft, en niet moeielijk in algemeene bewoordingen te beschrijven. Het is, volgens zeker schrijver, "een industriele conditie waarin het leven het doel is van den arbeid en de arbeid het middel van het leven is. Ieder man bearbeidt op de beste wijze wat hij best toe geschikt is, ten

nutte van allen en niet enkel voor private winst. De werklui en kapitalisten zijn in vrede, want allen zijn arbeiders voor een algemeen doel, en het kapitaal is slechts het middel om den gemeenschappelijken arbeid doeltreffend te doen zijn. Stoffelijke hulpbronnen worden bezuinigd en de arbeid wordt aangewend en bestuurd met slechts een doel in het vooruitzicht, het bereik van de grootste hoeveelheid en hoedanigheid van des menschen leven."

Geen duidelijker illustratie van de macht der co-operatieve beweging en hare toekomstige mogelijkheden kan gegeven worden dan het volgende uittreksel van een officieel bulletin van het Fransche Landbouw Departement, verleden jaar gepubliceerd:—

"Het Groothertogdom Hesse-Darmstadt is heden de onbetwistbare hoofdplaats van de Deutsche co-operatieve landbouw beweging. Te Darmstadt is gelegen de zetel van de Imperiale Unie van Deutsche Co-operatieve Genootschappen, waarmee geamalgameerd werd, in het begin van het jaar 1905, de Algemeene Unie van Plattelandsche Co-operatieve Genootschappen, die te Nieuwied zitting had. Deze daad vereenigde in een enkel groep twee machtige centrale banken, 40 nationale of provinciale unies, 68 centrale co-operatieve genootschappen en 15,650 landbouw co-operatieve genootschappen, tellende 1,200,000 leden. De heer Haas, de organiseerder daarvan, is president van deze landbouw republiek, en het is uit Darmstadt dat co-operatieve denkbeelden zich verspreiden naar alle Deutsche landen en zelfs naar de Deutsche gemeentes van Oostenrijk die hare landbouw organisatie geschoeid heeft op het Deutsche model."

Eenige der grootste co-operatieve genootschappen van Engeland ontstonden op heel eenvoudige wijze. De Civiele Dienst winkels, bijvoorbeeld, ontstonden uit den gezamenlijken aankoop van een kistje thee door een klein aantal burgerlijke ambtenaren. De prijs per pond waartegen zij de thee konden overnemen was zoo laag als een gevolg van het samendoen om de kist te koopen wanneer met den gewonen kleine maat prijs vergeleken, dat het aanleiding gaf tot het samen komen om meer kistjes thee en andere artikels van het dagelijksch gebruik te koopen todat de omvang van het werk te groot werd om door de civiele ambtenaren zelf behartigd te worden en zij moesten iemand aanstellen om de goederen voor hen te koopen. Heden maken de Civiele Dienst winkels een van de rijkste genootschappen uit in Engeland. Het succes daarvan is toe te schrijven aan het feit dat het voorziening maakte in een gemis en was de verstandige beoefening van het vereenigd gezond verstand der Civiele Dienaars. Terzelfder tijd dient aangemerkt te worden dat het genootschap is een aandeelen maatschappij, niet een echte co-operatieve vereeniging.

Ik kan voorbeelden van succesvolle co-operatie in een oneindige reeks aanhalen, doch, zal sluiten met te wijzen op eene in Natal zelf te vinden.

Te dikwijls is't het geval dat onze mielies verkocht worden aan den russen man of agent, die door het land reist en met iederen boer afzonderlijk handelt, knibbelende, de kwaliteit als minder voorstellende en den prijs afslaaude, de eene boer tegen den andere afspelende, en ten slotte tegen een groote profijt voor hemzelveu de mielies van de hand zettende die hij er geslaagd in is van de boeren te krijgen tegen bespottelijke prijzen. De boeren in het Dalton district der Umvoti County, door een verstandig gebruik van hun gezond verstand, besloten dat zij hunne mielies niet tegen schadelijke prijzen op deze wijze zullen verkoopen. Dientengevolge bespraken zij de zaak, huurden een man tegen een salaris van £500 per jaar om zich met de aanvraag en prijzen op de markt bekend te maken en dan hunne produkten op de voordeligste wijze te verkoopen. Het was een stoutmoedige stap om zich te verbinden dit salaris te betalen, doch co-operatie betaalde hen van af den aanvang. Het gevolg is dat zij er altijd op rekenen kunnen hunne produkten tegen de hoogste prijzen te zullen verkoopen, zij zijn in staat het salaris van hun bestuurder of zaakwaarnemer te betalen en ontvangen bovendien beter betalende prijzen voor de produkten dan zij ooit te voren kregen voor zij in het leven riepen wat voor vele boeren een dure organisatie lijkt. In de Mei uitgave van het *Journal* hoop ik een verslag van de operaties van dit genootschap te kunnen publiceren.

Mijn doel, om kort te gaan, met dit artikel is geweest om te toonen dat, evenals de man die ontdekte dat hij heel zijn leven proza sprak, wij hebben gehandeld en nog dagelijks handelen in co-operatie niet alleen de eene met den andere maar zelfs met tallooze personen over de geheele wereld verspreid; dat deze co-operatie onbewust en gedwongen is, en in vele gevallen ons tot deelen van machines verlaagt; en dat, door samen te handelen in eene bewuste en verstandige co-operatie kunnen wij niet alleen ons lichamelijk en zedelijk welzijn verbeteren, doch zullen tevens ons best doen om dat industriele duizendjarig rijk voort te helpen welk, hoe hersenschimmig het ook schijnt, toch ieder moet voorkomen als allerwenschelijkst al is het zeer onwaarschijnlijk.

EXPORT OF ANGORA GOATS FROM O.R.C.—A Proclamation in the *O.R.C. Government Gazette* of the 3rd May announces that the duty of £100 imposed by the Angora Export Duty Ordinance of 1907 on the export of Angora rams and ewes shall not be payable on the export from the O.R.C. of any Angora ram or ewe to either of the Colonies of the Cape of Good Hope, Transvaal, and Natal.

The Cultivation of Pineapples.

By E. R. SAWER, Director, Experiment Stations.

It has been suggested that, in view of an export industry being established in Colonial fruit, some information on the subject of the cultivation of Pineapples may be of service to farmers wishing to plant this crop for the first time, and without previous experience.

Pineapples are being grown in South Africa on all classes of soil, ranging from dark red clays, heavily charged with iron, to light granite sands on which few other crops can be raised without heavy manuring. On the whole, however, the latter would seem to be in greatest favour, and for reasons that may be gathered from a comparison of our own with results obtained in other pineapple-producing countries. In a bulletin published by the United States Department of Agriculture, Mr. R. H. Rolfs writes:—"The proper selection of soil for pineapples is the most important problem in connection with their culture. The requirements of this plant in this respect are so different from the ordinary fruits that it took many experiments to convince the would-be pineapple-grower that he has here a plant that demands a soil intolerable to the ordinary crop of vegetables. This crop can be grown upon land that will produce ordinary vegetables, but the soil must be of loose and open nature, and not allowed to become water-soaked. It is not the fertility nor the humus in the soil that is detrimental to the pineapples, but it is the want of free drainage."

Mr. A. H. Benson, writing on the same subject in the *Queensland Agricultural Journal*, also lays stress on this particular point:—"When selecting a soil for pineapple culture the first and most important consideration is to make quite certain that it possesses perfect natural drainage. No stagnant water must on any account come into contact with the roots, and even during periods of excessive rainfall the soil must not become sodden and soured. Should such a condition of the soil occur, the finer root fibres are killed, and, although the plant may not show any immediate signs of injury, it is bound to do so sooner or later, and if the condition of the soil is not improved the plants will eventually die out. The perfect drainage, so essential to the successful production of this fruit, can only be obtained under natural conditions, where there is a porous subsoil, as if there is any hard pan or excess of clayey or other impervious matter in the subsoil it will retain more or less stagnant water, especially during periods of prolonged wet weather. The character of the subsoil is therefore of the first importance, as no matter how suitable the soil proper may be, if the subsoil is unsuitable the plantation is bound to suffer.

"There is also one other very important consideration to be noted in favour of naturally well drained soils, and that is that they are warm soils, and plants growing on them are much less liable to injury during any cold spells than in the case where the subsoil is unsuitable, and the soil thus naturally colder.

"Land possessing a friable soil, and a friable and naturally well drained subsoil, will stand drought well, as capillary attraction is good under such conditions; and, if the surface is kept well worked, the soil will be supplied with sufficient moisture for the plants' requirements."

Preparation of the Land.—It should be remembered that, once established, the plantation should stand and give good results for a number of years. This period will vary with the thoroughness of the original cultivation. Frequent replanting adds considerably to the cost of upkeep, but will be necessary unless the land be brought in the first place to as perfect a tilth as possible. For with the more or less rapid spread of the suckers to the spaces between the original plants, surface cultivation and manuring become increasingly difficult, and the benefits of the initial preparation of the soil will be felt. Where only a small plantation is contemplated, the grower cannot do better than have the site thoroughly trenched or hoed by hand to a depth of not less than 14 inches, and carefully cleared of all roots. If operations on a larger scale are planned, the disc or mould-board should be followed by a strong bull-tongue capable of thoroughly bursting up the subsoil. The surface should then be reduced to as perfect a tilth as possible. These operations will sweeten the land, improve its drainage, and render it retentive of moisture during drought.

Manuring.—Although, as stated above, a light sandy soil offers the best medium for the growth of pineapples, it is not to be presumed that due provision of fertilising substances is to be neglected, and, while it may be true that the richest soils do not produce the finest flavoured fruits, a serious deficiency in any necessary element of plant food will result in stunted growth and a poor crop. Mr. A. H. Benson, in one of the admirable series of articles mentioned above, points out that with the pineapples, as with most fruits, potash may be said to be the most dominant plant food, as it forms the greater portion of the ash of both plant and fruit, and its absence from the soil renders the latter absolutely incapable of producing pines. Wood ashes contain a high percentage of potash, and are in some respects preferable to kraal manure, acting to a certain extent as a preventative of insect attacks, whereas the latter frequently serves as a medium for the introduction of cut-worms and allied pests.

According to Mr. Rolfs, the quantity of phosphoric acid required is only one-tenth that of potash, so that the addition of a phosphatic fertiliser to the wood ashes, which contain a varying proportion of this element, will only be necessary in exceptional cases. If obtainable, how-

ever, bone meal may be given in a light dressing. "Superphosphate in this connection is decidedly an unprofitable fertiliser." Nitrogen, necessary to the proper development of plant and fruit, can be best supplied through the agency of some leguminous crop, such as kafir beans or monkey nuts, sown and fed off or ploughed in before the plantation be organised. The green soil will further improve the mechanical condition of the land, rendering it friable and more retentive of moisture in drought. A dressing of lime will exercise a similar mechanical effect, opening and warming the soil, and is to be recommended where obtainable at a cheap rate.

Propagation.—As the pineapple under ordinary cultivation does not produce seed, various parts of the vegetative body are employed for the purpose of propagating new plants. These are known respectively as "suckers," "slips," or "robbers," "crowns," and "stumps." "Suckers" are shoots springing from near the base of the parent plants, and are preferred by the majority of planters. "Slips," or "robbers," grow from the base of the fruit, and in certain varieties give rise to excellent plants, but do not as a rule produce fruit as early as suckers. This, however, is not necessarily an objection, seeing that the first fruit from a sucker is frequently of inferior character, being formed before the new plant is properly established. The "crown" is the tuft of leaves springing from the top of the fruit. This is rarely used in propagation, as the resulting plant does not come into bearing for at least two, and in the majority of cases three, years. "Stumps" are old plants, which have already borne fruit, and are replanted by some growers for the vigorous suckers which spring from them. Many writers recommend that when difficulty is experienced in obtaining plants, the growth of slips should be encouraged, and these pricked out in a nursery for some months before being permanently planted. Whatever part of the plant be employed, scions should only be taken from parents of known excellence, by which means alone a standard of quality can be maintained. Do not employ suckers showing a dark line running through the length of the leaf, as this is generally a sign of "crippled stock," i.e., pines producing malformed or misshapen fruits. (Benson.) Improvement by selection is as necessary in the case of pineapple culture as in any other branch of horticulture.

Planting.—Before planting suckers, pull off all the lower leaves, and cut off the hard base just below the rootlets. If the bottom leaves are not removed, the young roots are apt to become matted, or "tangle-rooted." When planting slips, break off the small bulb at the base and also the lower leaves. Do not set the scions too deep, and carefully avoid getting soil into the heart of the plant, as this will almost certainly destroy it. If the ground has been brought to a really good tilth, the plants can be inserted by hand along a line without opening a furrow, and then firmed with the foot. If a trench is required, it can be easily opened

with an "Iron Age" or "Planet Jr." horse-hoe. The most vexed question of pineapple culture is the best method of laying out the plantation. Several systems are in vogue in different parts of the world, all of which have strong supporters who cite considerable advantages in favour of each. The simplest and perhaps most generally adopted plan is to plant the scions in single rows some nine feet apart, with a spacing of one or two feet in the rows. The ground between the rows is generally planted for the first year or two with some such subsidiary crops as tomatoes or cabbages, until the pines spread and occupy the whole of the land. Growers are by no means unanimous as to the best distance at which to place the plants in the rows. On the other hand, it is urged that close planting leads to early maturity and less necessity for weeding between the plants, while, on the other, it is claimed that stronger and healthier pines can be secured by allowing a wider spacing. In this country the system of open planting in single rows has been generally adopted, and, though the results have been in most cases satisfactory, it is worth our while considering the advantages of other methods. Messrs. Webber and Rolfs, of the United States Department of Agriculture, describe in their bulletin the culture of pineapples as carried out in the State of Florida. In place of the single row system, the ground is marked off in lands about 15 feet wide, with intervening spaces. These lands are then laid off in triangular checks of from 18 x 18 to 30 x 30 inches, according to the variety under cultivation. This relatively close setting allows the plants to support one another, obviating any danger of their being blown over, and, as they soon close up and occupy the whole ground, serves to keep down the growth of weeds. Each plant has sufficient room for proper development, and cultivation by means of a long hoe is possible from the sides of the lands without stepping through the plants. The horse-hoe can, of course, be used to advantage during the first season, but, as soon as the plants begin to close up, the only culture possible is by hand. Against these advantages must be placed the difficulty of gathering the fruit, and the need for constant and systematic thinning.

Planting may be conducted either in spring or early autumn, the former season being preferable if plants can be secured in the desired quantity. Growth will then be steadily maintained throughout the summer, and the plants thoroughly established before the winter. A better supply of suckers will, however, probably be forthcoming in the autumn, which should be set out as soon as sufficiently sized, so that good root growth may be made before the winter drought sets in.

Cultivation.—Constant and thorough surface cultivation is as essential to the success of the pineapple plantation as to that of other orchards. The extent to which the horse-hoe can be employed will depend both upon the method of planting adopted and the age of the plantation. In any case it should be supplemented by hand hoeing and

weeding among and near the plants. This work will also include the thinning out of overcrowded beds, when the suckers become so numerous as to be weak and spindly, and therefore unable to produce good fruits. In addition, all slips not required for replanting should be removed from the pines, and where a sucker has produced a fruit, the old stump above it should be cut away. Thin out the suckers to the strongest and healthiest, endeavouring at the same time to secure an even distribution of the fruit. This work is best done in the winter, when the scions removed will be available for spring planting.

Varieties.—There are numerous cultural varieties of pineapples, of which, however, only a few figure commercially. The work of determining the relative suitability of the best kinds to our local conditions is still before us, and it is one which we could earnestly wish might be taken in hand at an early date. The following varieties are grown in Jamaica, for the suckers of which there is a great demand:—Ripley, Sugar Loaf, Queen, Trinidad, Smooth Cayenne, and Black. Of these the Queen is supposed to be the oldest pineapple we have, and is said to be one of the best varieties for general cultivation. The Cayenne differs from the other varieties named in possessing smooth leaves. The fruit is above the average size, and highly flavoured, but the period of ripening is somewhat protracted, the pine taking about 22 weeks from flowering to ripening, as against the 20 weeks required by the Queen. It is not, again, as good a fruit for preserving as the rough varieties, the flesh being too soft and not standing cooking well. The Ripley may be distinguished by the pale copper colour of the fruit when ripe, and by the long acute points with which the scales are armed. It matures early, and its fruit preserves well, but is rather a shy bearer. These three varieties can be recommended to intending growers as a satisfactory basis for a general purposes plantation, the Smooth Cayenne furnishing an almost perfect table pine, while the two rough-leaved pines will yield fruit suitable for a possible future industry in canning.

Orders are now being placed for suckers of Ripley, Sugar Loaf, Trinidad, and Black, and it is to be hoped that early distribution of these varieties may be effected from our own propagating plantations.

Ground Nuts.

GAMBIA exported 36,050 tons of ground nuts in 1906. The *Board of Trade Journal* states that the bulk of the nuts go to Marseilles and Bordeaux, where they are manufactured into oil. The oil is extracted in various qualities, some of the finer being employed in the tinning of sardines and other uses connected with the table, the coarser oil being used in making soap, feeding cattle, etc.

Chats About Insects.

ADDRESSED TO THE STUDENTS, CEDARA SCHOOL OF
AGRICULTURE.

BY THE GOVERNMENT ENTOMOLOGIST.

I.

It is, I understand, the full intention of you all to ultimately become farmers either in Natal or in some other part of South Africa. You are at this school of agriculture in order to be equipped, to a certain extent, with the knowledge necessary to become successful in the avocation of your choice. Knowledge of a given subject can only be imparted to a certain extent, and the possession of this knowledge does not necessarily insure success; but it is by personal effort and by the practical application of that which you do acquire, to the varying conditions met with, that success is the more likely to be ultimately achieved.

The pursuit of agriculture is as ancient and honourable a calling as any which has marked the history of civilised man. Often and again one hears it facetiously said "the farmer is the backbone of the country," and never are truer words said in jest than these.

Your calling is to wrest from Nature her spoils; the more you know of Nature and her ways, the better you will be able to achieve success; and, in proportion with your appreciation of the wonders of life which will surround you everywhere, the happier your existence will be.

Apropos of the battle royal fought between the agriculturist and Nature, a modern poet has written:

Nature a mother, kind alike to all,
Still grants her bliss at labour's earnest call,

meaning that only by hard work can success be achieved in farming. It was a very ancient philosopher who summed up farming in general with the remark that the Father of us all decreed, in the beginning, that the way of the agriculturist should be hard. He did not mean thereby that it should be hard only in respect to the bodily labour needed for the cultivation of the crops, but that there were numerous natural handicaps to be overcome in the bringing to maturity of the same.

Modern philosophy recognises that amongst all living things of the earth and of the sea—man, animals and plants—the round of existence is a struggle for the life of the individual and, through it, of others of its kind.

To live, to mature, and to reproduce, each its own kind: to such ends

do all animate organisms strive; and each and all, including man himself, have an equal right to live and to increase. I mention this fact to you because I am so often asked: "What is the use of this or that?" What, for instance, is the use of ticks? Well, in all these cases, it is man asking the question, and from his point of view, there is no use for many things.

The more one probes into the secrets of Nature, however, the more one realises the possibility that these, to us, useless animals and useless plants had, at one time, great potentialities. Indeed, it is safer to say that all things have their use than that even one is useless. The continued existence of all animate organisms is continually challenged and threatened, but there is one aspect of the drawbacks to the easy raising of crops and herds which appeals to all, and that is, that the meeting with and the surmounting of these obstacles have tended more to the elevation of man than aught else. Had this earth been fitted out as a Garden of Eden, and had man had nothing whatever to contend with, he would never have advanced to that comparatively perfect state of civilisation which he now enjoys, but would have remained an indifferent creature.

I make mention of these matters because I want you to see things in varied aspects, rather than from one point of view—their utility to man.

THE CLASSIFICATION OF ANIMALS.

The discussion of animals known as "Insect Pests" by the agriculturist entails a review of a very large part of the animal kingdom, because the term "insect" is indiscriminately applied to all sorts of creatures, more particularly those which are a nuisance in one way or another. "An insect of some sort," to use a term often applied to some pest of the farm, garden, or orchard, may refer to a very wide range of animals, and even to some plants!

In order to thoroughly understand the distinctions between animals commonly referred to as insects, and at the same time to recognise such relationships as exist between them, some account of the classification or arrangement of the animals in their natural order is necessary. All the objects which surround us in Nature belong to one of three great divisions; these are the Animal, the Vegetable, and the Mineral Kingdoms.

The members of the first two kingdoms, Animals and Plants, exhibit that remarkable attribute, life. Minerals, on the other hand, are lifeless or possess no vitality in the sense in which it is usually spoken of. There is a great gulf between living and inanimate things, which appeals at once to our perception. Again, at first sight, a vast difference is recognised between animals and plants, but the further these two great divisions of Nature are studied, the more elusive does the distinction become. Between so highly organised an animal as the horse

and an oak tree, the differences are at their maximum. The horse feels and moves about, whilst the tree has no sensation and is fixed in the soil. These are great distinctions, but how little they can be relied upon is evidenced by the fact that many trees and plants can feel—for example the sensitive mimosa—and, again, there are many animals which are fixed in one place like a plant, of which the sea anemone is an excellent example. There is no great gulf between animals and plants, as, when the lower forms of the two kingdoms are examined, members of one and of the other are met with which present many similitudes of nature and habit. In short, it may be said that the two kingdoms gradually merge into one another, and are linked by a group of organisms known as Fungus animals.

These fungus animals may be likened to minute masses of clear, thin jelly. They are remarkable on account of the peculiar manner in which they move, which is spoken of as “amoeboid movement.” In moving in any given direction the side of the body is protruded at one or more points, and the protuberances so formed draw after them the whole body. They can send out one or many finger-like processes, and alter their appearance and shape in many ways. A single process may be sent forward a comparatively long distance, and can be gradually enlarged at its tip, filling out by the flow of the body mass along the process. Again, two finger-like processes may be thrown out, and these may approach and coalescing become one. By the means of the processes, these creatures move, engulph their food, and penetrate into other bodies. They are similar in many characteristics to the white corpuscles of the blood: those peculiar bodies so often spoken of as the “policemen” of the body, because they feed upon disease germs and other poisonous and dangerous elements. One of these corpuscles or phagocytes, in penetrating the wall of a blood vessel, throws out a pointed process which pierces the membrane, and the whole body mass is ultimately transferred in position from one side of the wall to the other, through this point. A phagocyte, in feeding upon, or rather engulphing the organisms of malaria, throws out processes which ultimately surround the germs, then coalescing they engulph them into the body of the mass, where they are destroyed by a digestive process. In this manner do fungus animals also engulph solid particles of food.

The many and varied creatures which make up the Animal Kingdom have been scientifically arranged and classified in as nearly a natural manner as possible by zoologists.

Animals are either VERTEBRATE or INVERTEBRATE. They either possess a bony framework, or they possess no bones at all. In one case the muscles and tissues of the body are draped about and attached to the outside of that framework of bones which, when separated from the flesh and arranged in its natural position, is called a skeleton. In the other case, the muscles and tissues are attached upon the inner side of

a skin which may be a tough or film-like membrane, or may be of a horny or shell-like nature.

The vertebrate animals from a natural division of the Animal Kingdom, and this is called a SUB-KINGDOM (*Vertebrata*).

The invertebrates do not group themselves together, but form a number of natural divisions of equal rank as sub-kingdoms. To pursue the matter further, it is found that the members of each sub-kingdom can be arranged in very natural groups; these are called CLASSES. For example: the sub-kingdom *Vertebrata* contains a number of animals which suckle their young. These form a separate class and are known as *Mammalians*: to this class man belongs, as well as the horse, cow, dog, lion, mouse, porcupine, whale and porpoise. Then the birds (*Aves*) form another very distinct class, as also do the Reptiles (*Reptilia*), snakes and lizards, the Amphibians (*Amphibia*), frogs and toads and the Fishes (*Pisces*). There are in all five classes of boned animals. Each of these classes is again divisible into natural groups, which are called ORDERS. In the case of the Mammalians, we have a group of two-handed animals, (*Bimana*), mankind, a group of four-handed animals, the apes, baboons and monkeys (*Quadramana*), a group of beasts of prey, lions, dogs, cats, etc. (*Carnivora*), a group which chews the cud, of which the ox, sheep, goat, and antelopes (*Ruminantia*) are well known illustrations; a group which lives in the sea, the whales, dolphins, and porpoises (*Cetacea*); a group which has a single hoof, the horse, ass, and zebra; a group of many hooved and thick-skinned creatures, like the pig, the hippopotamus, and several others. All of these groups rank as orders.

Just as it is practicable to divide sub-kingdoms into classes and classes into orders, so orders are again divisible into natural groups. Take, for example, the order of *Carnivora* (beasts of prey). In this order we find a number of familiar animals and readily recognise distinctions amongst them. The minor groups which are comprised in an order are known as FAMILIES. There is a strong family likeness between the tiger, leopard, lion, and cat, and an equally marked one between the wolf, jackal, hyaena, dingo, fox, and dog, whilst the distinction between the two groups is equally pronounced. Hence the former are grouped together in the Cat Family (*Felidae*), and the latter in the Dog Family (*Hyaenidae*). Then there is the Weazel Family, a well known representative of which is the Otter.

Families are divided again into GENERA, and each genus contains a number of SPECIES. If we take the dog family we find it comprised of several genera, the Hyaena genus, the Dog genus, and the Cape Hunting Dog genus. In the dog genus, we find the domestic dog, the fox, the wolf, and the jackal, all individual species.

To recapitulate: A number of animals *alike in every detail* form a species. As an example of a species, we may take the House Swallow. A genus comprises a number of animals agreeing in their most important

features but differing in minor details. The House Swallow belongs to the genus *Hirundo*, which includes several other true swallows. A family comprises a number of genera which resemble one another. The genus *Hirundo*, together with others, the different Swifts (Genus *Cypselus*), the Night Jars (Genus *Caprimulgus*) make up the Swallow Family. A number of families with certain features in common form an order. The Swallow Family (*Hirundinidae*), the Crow and Magpie Family (*Magnirostres*), the Sparrow and Hawk Family (*Conirostres*), and the Wag-tail, Robin, Wren, and Thrush Family (*Subulirostres*), make up the order of perching birds (Order *Passeres*).

The other Bird Orders are:—

- I. The birds of prey (*Raptores*): Eagles, hawks, buzzards, and owls.
- II. The Climbers (*Scansores*): Toucans, parrots, cuckoos, and woodpeckers.
- III. The Doves (*Gyrantes*): Pigeons and doves.
- IV. The Poultry Birds (*Rasores*): Partridge, quail, pheasant, turkeys, guinea-fowl, and common fowl.
- V. The Waders (*Grallatores*): Water hens, snipe, corncrakes, plovers.
- VI. The Swimming Birds (*Natatores*): Ducks, geese, seagulls, etc.
- VII. The Running Birds (*Cusores*): Ostriches, emus.

Seven orders in all form the Bird Class (*Aves*) of the Sub-kingdom *Vertebrata*. THE SCIENTIFIC NAMING OF ANIMALS.

In speaking of a certain animal it is usual to give its scientific name, because it is necessary to indicate exactly which species is being referred to. English names exist for certain animals, and can often be used without the likelihood of there being any confusion. A horse, an ass, or a cow is recognised as a distinct species by everybody, because their external features are so very well known, but with the majority of animals this is not the case. Further, the same name is often applied to very different animals. In Natal, where no such animal exists, the word tiger is quite commonly used. If one were to write casually of an elephant, all would know that reference was being made to the African elephant, but readers in other lands would not necessarily understand this, and it therefore becomes necessary to give each creature a distinctive name, so as to avoid any possible confusion. For this purpose, it is always referred to under the name of the genus to which it belongs first, and the genus name is then followed by a specific name. Thus all the elephants belong to the Genus *Elephas*, and the African species is called *Elephas africanus*; this serves to distinguish it from the Indian (*Elephas indicus*) and the Sumatra elephant (*Elephas sumatranus*). Animals are accordingly named on what is called the binominal system. In a way, they are named like ourselves, the specific name representing our christian name, and the generic our family name, the positions, however, being reversed. The system was invented by Linnæus, and is applied to plants as well as to animals.



"DUPLEX" FENCING MACHINE

Natal Agricultural Union.

ANNUAL CONFERENCE.

SECOND DAY'S PROCEEDINGS.

MR. TANDY, on behalf of the Hatting Spruit Association, moved:—"That, in the opinion of this Union, the Government should require the Railway Department to accept goods and take all responsibility on either side of the main line at railway stations in districts where Tick Fever restrictions exist."

The motion was carried unanimously.

VETERINARY DEPARTMENT.

The Seven Oaks Association moved:—"This Union is of opinion that the time has arrived when the Government should take into consideration the advisability of making the Veterinary Department self-supporting, so that the Colonial Treasury may be relieved of the upkeep of this Department."

In the discussion that followed, Mr. Van Rooyen said he considered the Veterinary Department was a burden on the Colony. (Cries of "No!") The Department was not worth the cost of its upkeep. They had no objection to a small veterinary staff. He was of opinion that the veterinary surgeon ought to be put on the same footing as the district surgeon. He did not think there was another British Colony that had such an expensive Veterinary Department as Natal had.

Mr. Dukes, in seconding the motion, said that the administration of the Veterinary Department had been wrong. They had had veterinary surgeons drawing £500 a year, and these men were doing more or less police work instead of the scientific work they should be doing. There should be a properly equipped bacteriological laboratory where diseases could be investigated. He was of opinion that a farmer requiring the services of a vet. would be only too willing to pay for those services.

Mr. Wiltshire said they ought to decide whether scientific knowledge was necessary. If so, they must continue the Veterinary Department. If they did not have properly trained scientific men, no assistance could be given to those who were not so trained.

The motion, on being put to the vote, was lost by 35 votes to 18.

ELECTION OF OFFICE-BEARERS, 1907-8.

Mr. Jas. King was proposed as President for the ensuing year.

Mr. Blaker proposed that the Rev. Jas. Scott be re-elected. He

pointed out that Mr. Scott had only filled the position of president for one year, and that it required more than a year before a president could show what he was worth. He knew of no other gentleman who could fill the position better or who worked harder.

Mr. Mitchell seconded; and, on a ballot, the Rev. Jas. Scott was re-elected by 51 votes to 15 for Mr. King.

Mr. Johnstone was re-elected Vice-President.

The following members of Committee to the Executive from the various districts were then elected:—

District No. 1.—Messrs. C. H. Mitchell, F. G. Colenbrander, Col. F. Addison, E. W. Evans, and W. Saville.

District No. 2.—Messrs. J. Moon, J. Marwick, H. Blaker, J. King, and C. E. Hancock.

District No. 3.—Messrs. S. Reynolds, G. L. Coventry, W. Craig, D. J. A. van der Spuy, and A. E. V. C. T. von Levetzow.

INTER-COLONIAL UNION.

The following gentlemen were appointed to act as delegates to the Annual Congress of the Inter-Colonial Agricultural Union to be held in Pretoria next August:—Messrs. Evans, Scott, Alexander, Johnstone, Dukes, S. L. Coventry, Friend Addison, Moon, Mitchell, Dick, Aitken, Craig, Marwick, Hancock, J. M. van Rooyen, Wiltshire, and J. King. It was decided that these gentlemen should, when at Pretoria, elect five of their number to vote at the Congress.

LIFE MEMBERS.

With reference to the resolution passed the previous day, regarding the election of ex-presidents as life-members, Mr. Mitchell proposed the election of Mr. G. D. Alexander, referring in high terms to the excellent work Mr. Alexander had done for the farming industry in Natal.

The motion was carried unanimously; and Messrs. Hyslop and A. K. Murray and Sir T. K. Murray were then also elected.

REDUCTION OF STOCK INSPECTORS.

On behalf of the Richmond Road Association, Mr. Alexander moved:—"That where there is both a veterinary surgeon and stock inspector in the same district, the office of stock inspector should be cancelled."

In moving, Mr. Alexander said the resolution had been before the Union on several previous occasions and had received a considerable amount of support. There was an additional argument this year in favour of it—the state of the Treasury. He explained that in many matters it was desirable that the veterinary surgeon himself should visit the stock concerned. Another thing was the fact that many of the stock inspectors had relatives in their own districts, and it was a difficult thing for them to be expected to summons their own relatives for having diseases amongst their stock. He considered that probably considerable

expenditure could be saved by adopting the plan proposed by his Association.

Mr. King thought that in some districts it might work. The vet. should be as far as possible available on every occasion. As far as the efficient inspection of stock was concerned, it was just as effectually done by the stock inspectors as by veterinary surgeons. He opposed the motion, on the ground of the impossibility of the veterinary surgeon performing the dual duties of stock inspector and professional officer as well.

Mr. Van Rooyen was of opinion that a stock inspector could not carry out his duties efficiently if he had not been already a stock-farmer.

Mr. Dick recommended that the matter be left to the Government; and it was decided to proceed with the next business of the Conference.

EAST COAST FEVER.

Mr. S. B. Woollatt, Principal Veterinary Surgeon, said he wished to explain the position of East Coast Fever in Natal. If they were going to wait for a cure, their cattle were going to be annihilated. The restrictions that had been imposed had been effectual in preventing the spread of the disease to the clean districts. They knew, from their knowledge of the disease, that if they were to get rid of this scourge, they must see that no cattle remained on the infected veld or in the vicinity of the infected veld. He wanted to make the position of his Department clear. It was not for him to say whether such-and-such policy could be adopted. It was his duty to show them a way to stamp out the disease, and it was for them to say whether they would adopt that policy. If they went on in the same way as at present, they would have the disease with them indefinitely. Although they might spend a large amount of money on precautionary measures, the disease would encroach upon them unless they adopted a policy of removal of cattle. They would spend during the next two or three years as much as it would cost the country to stamp out the disease. What was required was a Compulsory Fencing Act. They must adopt practical measures to see that infected cattle did not get out of the infected areas. A fence would stop the spread of the disease if it would stop cattle, but there were individuals who would find a means of getting through a fence. He asked for the whole-hearted co-operation of farmers in stamping out the disease. He wished to make his position clear so that if the Colony in this respect was the same in three of four years' time as it was to-day, they could not point to the Veterinary Department and say it was their fault. His Department had power to destroy animals and pay compensation; but was it policy to destroy animals when they knew they could make use of the meat with safety? As regards Zululand, he was sure the disease would go through it, owing to the unfenced condition of the Province and other conditions appertaining to a native

territory; and they should take steps not to allow Zululand to remain a constant source of infection.

In reply to a question as to whether an immune beast would ever become a source of danger in clean districts, Mr. Woollatt said that all experience had shown that in no case had such animals been a source of infection. If, however, a cow, which had recovered and remained on infected veld for eighteen months, dropped a calf, that calf could continue the infection. He further explained that there were three species of tick which could cause East Coast Fever. He also said he did not think they would be justified in spending the large amount of money that would be required in discovering a cure. They were taking full advantage of the experiments that were being conducted in other parts of South Africa, but he was of opinion that the policy of stamping out would be the only effective one.

A vote of thanks to Mr. Woollatt, moved by Mr. Francis, was carried unanimously.

MR. PEARSON'S REPORT.

Mr. Van Rooyen moved, on behalf of the Seven Oaks Association.—“This Union considers that the report book of Mr. Pearson, late Director of Agriculture, should be published for general information by the Government.”

He considered that they ought to receive something of the results of the labours of the late Director of Agricultural Experiments and Chemistry. The reason given why the report was not to be published had been that of the financial position of the Treasury. The Colony had, however, spent a lot of money on Mr. Pearson, and he considered that report should be published for the benefit of the farming community.

Mr. Mullens, in reply to a question, said the cost of printing the report would be about £300.

Mr. Mitchell thought the question of the advisability of printing the report was one that should be left in the hands of the Government.

Another speaker considered that publication in the *Agricultural Journal* would meet the case.

Mr. Deane said the report was not yet complete. Mr. Pearson was still writing up certain further chapters of it in Australia. Parts of the report *could* be published in the *Journal*.

Mr. Evans moved, as an amendment, that the report be published in instalments in the *Agricultural Journal*.

Mr. Van Rooyen withdrew his motion, and the amendment was carried unanimously.

SLEIGHS ON GOVERNMENT ROADS.

The Gourton Farmers' Association moved:—“That the law preventing sleighs from using Government roads should be strongly enforced.”

This motion was opposed on the ground that sleighs did no damage. It was pointed out that the ordinary wagon did more damage. The motion was lost by 16 votes to 34.

KAFIR FARMING.

Mr. W. C. Stockil moved, on behalf of the Gourton Association:—"That the Government be urged to stop kafir farming."

Mr. Woods, in seconding the motion, expressed the opinion that these kafir farmers were a curse to the Colony. They were raising hundreds of kafirs on their farms who were turning into "lazy, loafing scoundrels." Ninety per cent. of the native criminals were living in those private locations. In the Orange River Colony the difficulty had been overcome by a Squatters' Ordinance, which limited the number of natives living on farms to the number required for labour. In Natal they were importing coolies to make up for all this labour that was being lost.

Mr. De Waal said that the absentee landlords should be taxed. A Bill for the purpose had been introduced into Parliament and had been thrown out by the Upper House. An Act such as this would hurt the natives indirectly, but it would help to scatter them to other farms where they were required. The absentee landlords must be taxed. In his opinion they were a curse to the country.

Mr. Peckham was of opinion that no further legislation was required. Ordinance No. 2 of 1855, were it enforced, would provide a remedy.

Mr. Kirkman also supported the motion. There was no greater curse in the country than kafir farming. It was quite right to recommend the Government to put a stop to it. It was not for the Union to say how it was to be stopped: it was for the Government to see to that.

The motion was carried unanimously.

. INDENTURING WHITE FARMERS.

The Gourton Association moved:—"That the Government be asked to arrange for young white men to be brought to this country from England, and indentured as farm assistants to farmers."

It was pointed out that it was to the interests of the Colony to have white youths on farms in preference to kafirs or Indians, as the former would eventually be able to take up farms on their own account.

Mr. Alexander pointed out that, in discussing the previous resolution, it had been stated that the unfavourable conditions here were the cause of many farmers' sons leaving the country, whilst here was a resolution now before the meeting advocating the importation by Government of white farm hands from England.

As an amendment, Mr. Dick moved:—"That this Union is of opinion that the Government be requested to enter into communication with institutions in Great Britain with the view to obtaining information as to

the terms under which white lads and girls could be obtained as apprentices to farmers, and to make public such conditions."

Mr. Stockil, in withdrawing his original motion, said there must be proper treatment for lads brought into the country. The Government should be approached in this matter.

The amendment, on being put to the vote, was carried unanimously.

DOG TAX AND BADGES.

Mr. Walton, on behalf of the Donnybrook Farmers' Association, moved:—"That, in the opinion of this Union, it is necessary that the Dog Tax be raised, with a view of reducing the number of dogs owned by natives, this in the interest of flock-owners."

He said the dogs owned by natives were too numerous. They roamed about the country and did much damage to flocks of sheep.

One delegate held that if the Police did their work in compelling the natives to show their licenses the difficulty would be met. The proposed increase in the tax would not help: natives would not pay, even if the tax were increased to a pound.

Mr. King thought the only way to reduce the number of dogs was to allow each householder to have one dog untaxed, and put a prohibitive tax on every other dog. The question remained, however, would they get at the natives? The natives could hide their dogs when the Police came along.

Mr. Hancock opposed the motion. The jackal was increasing in the Colony. In the Underberg district they were doing considerable damage. They must have packs of dogs to hunt the jackal, which is the natural enemy of the dog. He considered that the raising of the tax would do no good.

Mr. Archibald considered that such a tax as this would be felt as another pin-prick by the native; and he asked whether it would be wise, in the present state of things, to increase the tax.

Mr. Evans moved:—"That the Government be urged to ensure the better supervision of dog licences by the Police."

Mr. Hosking moved:—"That the dog tax remain at 5s., but that the Government be urged to issue a different coloured badge every year."

It was pointed out that the Police examine the licences, which were of a different colour every year. The Police never saw the dogs, and only inspected the licence itself. They should visit every kraal and inspect the badges.

Mr. Evans' amendment was carried.

On behalf of the Royal Agricultural Society, Mr. Hosking moved:—"That, in view of the difficulty of identifying dogs found destroying sheep and small stock, and the increasing losses from such destruction, this Union is of opinion that the Government should be urged to carry out strictly the Dog Tax Law, and also to make such provision in the law as shall compel owners of dogs to put on their dogs the official collar

and badge under a penalty for failure of £2 for a first offence and £5 for a second offence."

Mr. Payne moved as an amendment:—"That this Union considers it desirable that power should be given to farmers to destroy dogs found among their sheep, whether with or without collars, and that no compensation shall be claimed by the owners of dogs so destroyed."

Mr. Payne's amendment was carried, the original motion by Mr. Hosking being lost.

At the commencement of the afternoon sitting, after some discussion had taken place regarding resolutions for the Inter-Colonial Union at its next Congress, Mr. Alexander proposed, and it was carried, that the committee to consider the formation of a

MEALIE GROWERS' UNION

should comprise the following gentlemen:—Messrs. Colenbrander, Mitchell, Archibald, John Moon, J. Marwick, R. W. Comins, C. L. Lund, E. W. Evans, the President, and the mover, with power to add to their number.

FRUIT GROWERS' UNION.

Mr. Alexander said that the idea was to keep all these things under the aegis of the Natal Agricultural Union. He strongly supported the principle that the Union should be the father of all Associations arising in connection with agriculture.

He proposed, and it was agreed, that the following gentlemen should form a committee to consider the formation of a Central Fruit-Growers' Union:—Messrs. Fannin, Kirkman, Illing, Colenbrander, Flaker, Johnstone, Wiltshire, E. W. Evans, Aiken, Slatter, and the mover.

CEDARA-BRED BULLS.

Mr. Walton moved, on behalf of the Donnybrook Association:—"That the Government be approached with reference to the sale of young bulls, bred at Cedara Experimental Farm, that the bulls be advertised for sale at a fixed price, applications to be made by the farmers, and if two or more applications be received for the same animal, lots to be drawn, no bull to be allowed to leave the Colony for five years after the sale."

He said the idea was to keep within the Colony these valuable animals, which had cost so much in establishing at the Central Experiment Farm.

Mr. Hosking was of opinion that all bulls should be sold by auction.

Mr. Kirkman moved as an amendment that the bulls be advertised in the Colony and sold in the Colony on such conditions of sale as Government may think best. This amendment, on being put to the vote, was carried.

CONTRACT SIGNING.

On behalf of the Lower Tugela Division Association, Mr. A. E.

Foss moved:—"That Sub-section 12 of Section 2 of the Masters' and Servants' Ordinance 2, 1850, be repealed; that the words 'Justice of the Peace or Commissioner for Oaths,' be substituted for the words 'or other proper officer,' in Sections 4, 5, and 6 of Chapter I.; that '£200' be substituted for '£20' in Section I. Chapter IV.; and that the remaining portion of such section be repealed."

The following is the Sub-section referred to:—"The words 'officer' and 'proper officer,' when used with reference to attestations or making of contracts of service or apprenticeship, or to the transfer and assignment of apprentices shall be construed and understood to comprise every person who shall have been appointed by the Governor to attest or make such contracts." Section I. Chapter IV., limits Magistrate's jurisdiction to cases wherein wages, remuneration, or compensation does not exceed £20. The remainder of the clause reads:—"Nor to enforce the performance of any contract of service or apprenticeship, the existence or subsistence of which is denied by either of the parties, in any case in which the stipulated or alleged term, or the unexpired period of the stipulated or alleged term shall exceed one year; nor to cancel or absolve any such contract."

Mr. Foss explained that the object of the motion was to make it simpler for farmers to have contracts with employees signed. At present a visit had to be made to the Magistrate for the purpose. The motion also sought to give Magistrates jurisdiction to give judgment for sums up to £200 in this respect, so as to obviate the necessity for disputants to go before the Supreme Court and incur the heavy expense of such actions.

The motion was carried.

ASSISTANCE TO AGRICULTURAL SOCIETIES.

Mr. A. von Levetzow moved, on behalf of the Vryheid (Ward I.) Farmers' Association:—"That this Union is of opinion that the Government should be urged to recognise the necessity of assisting the Agricultural Society of Vryheid with the usual grant, while unable to hold shows and to procure subscriptions in consequence of the ruination caused by the East Coast Fever in the Northern Districts."

Mr. Kolbe (of the Vryheid Association) assured the meeting that they would not come for assistance if such assistance were not necessary. There were at present very few solvent people in the Vryheid District. The assistance of the Government had come too late. They were simply asking that the grant, which was on the Estimates, be made in spite of the fact that no show was to be held. Under existing circumstances, the usual conditions could not be fulfilled. For the last six years they had been unable to hold a show. Traffic could not take place, so that it was impossible to hold a show this year. If the Association got the subsidy from Government, they could hold out. It might create a pre-

cedent, but he was sure the other societies were not in the same position as the Vryheid Association.

Mr. Tandy opposed the motion. The Vryheid Society could get the grant if they complied with the conditions. The object of the grant was to help shows. If there was no show, what was there to help?

It was also pointed out that the Government would be going beside the law in making a grant in a case where no show was held.

As a result of the opposition shown, the motion was withdrawn.

SCAB ACT.

Mr. Johnstone moved, on behalf of the Newcastle Society:—"That the Scab Act be amended to include goats of all kinds."

After a short discussion, the motion was carried.

CENTRAL S.A. LABORATORY.

Mr. Hosking, of the Royal Agricultural Society, moved:—"That, in the opinion of this Union, the time has now arrived when the investigation of cattle diseases should be made from a central institution, supported by all the Colonies of South Africa."

He pointed out that such a central institution for the investigation of disease would be an advantage, as all the Colonies of South Africa suffered from the same cattle diseases.

Mr. Dick, in seconding the motion, said that it was not brought forward out of any feeling against the Government Bacteriologist, but the outcome of the scientific research carried on by the Bacteriological Department had been nil. Year after year they had been told that this institution was experimenting. To-day they were still informed that they were experimenting. They were informed that they were held back for want of funds. It was a complete farce. By having a central institution they would reap the benefit of what all the other Colonies were doing. Their object in bringing forward this motion was to ascertain whether the other Colonies were prepared to support such an institution.

Mr. Alexander took exception to some of the remarks made by Mr. Dick to the effect that the Bacteriologist's Department had been of no use to the Colony. There was, for instance, every prospect of the calf disease being cured. The very fact that the Bacteriologist had discovered a curative serum was quite enough to justify the existence of the institution.

Mr. Kirkman also protested against the imputation regarding Mr. Pitchford. In his opinion they had better stick to Natal and ask the Government to back that institution, and so preserve their individuality.

On being put to the vote, the motion was lost.

"AGRICULTURAL JOURNAL."

Mr. Shawe, on behalf of the Utrecht Farmers' Association, moved:—"That this Union again urges upon the Government the advisability

of publishing the *Natal Agricultural Journal* in the Dutch language as well as in English."

Mr. Deane (Minister of Agriculture) said the Government had no objection to printing the more important articles in Dutch. If the gentleman who wanted the *Journal* printed in Dutch could assure him that by so doing there would be 200 extra subscribers, the whole *Journal* would be printed in Dutch.

Mr. Van der Spuy asked who was to give a guarantee. They were not prepared to give any guarantee.

Mr. Marwick said if they could not guarantee 200 subscribers they did not want the *Journal*.

Mr. Deane said he did not want a definite guarantee: he only wished to make certain whether it was worth while to have the *Journal* printed in Dutch. The Government intended to print certain of the articles in Dutch, and if it was found that the circulation was sufficiently increased thereby, the whole *Journal* would be printed in Dutch.

One delegate offered to give a personal guarantee for the 200 copies.

After a little further discussion, the motion was carried unanimously.

CATTLE PASSES.

Mr. Payne moved, on behalf of the Richmond Road Association:—"That the following additions and alterations be made to Act 1 of 1899, Cattle Stealing Act: That a cattle pass shall only be valid when made out on the printed form supplied by Government; that a record be kept and a charge of 1s. be made for all books issued; that it be a punishable act to neglect to keep all counterfoils filled in, and that the Police examine books when on patrol; that a pass shall distinctly state the name, or owner's name, of the farm and district to where the cattle are being driven; and that before issuing a pass a person shall ascertain whether the owner of the farm to where the cattle are going is willing to allow the cattle to go on to his farm."

Mr. Foss considered that the law as it stood was stringent enough.

Mr. Alexander explained that the pass books in question were issued indiscriminately. If they were numbered it would be possible to see to whom they were issued. They should be numbered in the same way as cheque-books, and it was for that purpose that the charge of one shilling was suggested.

In response to a suggestion, the mover agreed to the deletion of the charge of 1s.

The motion was carried, after the clause referring to the charge of 1s. had been deleted.

CONVEYANCE OF FERTILISERS.

Mr. Alexander, of the Richmond Road Association, moved:—"That the Government be asked to check the number of sacks of fertilisers

carried by the railway at the special rate Class B. No. 11, and that a small extra charge be made for this."

He explained that the object of the motion was to prevent the loss of fertilisers during carriage. At present the Railway Department took no responsibility for such loss.

The motion was carried.

LOSSES OF MULES.

Mr. Dukes, on behalf of the Farmers' Association of Vryheid Town, moved:—"That the attention of the Government be called to the fact that several of the mules and donkeys imported to this district are infected and suffering from an unknown disease and die suffering from such disease. That the Government be requested to give other mules or donkeys in the places of the mules or donkeys dying from such disease."

Mr. Woollatt, in explaining the position of his Department in the matter, referred to cases in which mules had died after having been handed over to applicants. All such mules, if they were infected before being issued, were replaced by the Department. Mules were issued in good condition, and if people did not look after them it was the look-out of these people. Government could accept no responsibility for mules that became infected after being taken over by farmers.

The mover then said he would like to leave the matter in the hands of the Government, and the motion was withdrawn.

LOCUST DESTRUCTION.

On behalf of the Noodsberg Road Association, Mr. Holley, jun., moved:—"That the attention of the Agricultural Department be drawn to the seriously inadequate supply of arsenic available for the destruction of locusts."

Mr. Mitchell, in seconding the motion, suggested that Mr. Fuller (Government Entomologist), who was present, be invited to explain the position.

Mr. Moon remarked that, when a swarm of locusts invaded his particular district, the Government could supply no arsenic, and the merchants, knowing this, had raised the price of the poison to as much as one shilling per lb.

Mr. Deane said that there were only five tons of arsenic available when the present Government entered office. His predecessor in office had asked for a sum of £1,500 for the purchase of arsenic, and had been refused. The present Government granted £3,300 for the purpose; and a cable was sent to England for the material.

Mr. Fuller said that the Department worked on the principle that farmers would destroy locusts on their own lands if the Government would destroy those on native lands. The sum originally granted on the Act of Supply for the destruction of locusts was only sufficient to

deal with the Coast lands, and he had to plan his work accordingly. The locusts had turned out worse than the reports had indicated, and the reports had been bad enough. He could not work any further than supplies would permit; and when he was granted the extra money it was then too late to organise and get material in time. He was quite agreed that a sufficiency of poison should be kept in stock. Owing to the representations of the Union to the Government, and of the Government to the other Colonies, they had got the other Colonies to move in the matter of locust destruction. Last year the Transvaal spent £10,000 and the O.R.C. £9,000. Cape Colony had done very little to help. The German and Portuguese Governments had taken the matter up. He did not want to see Natal, after showing the way, to drop out. A Central S.A. Locust Bureau had been started, consisting of representatives from the various Colonies. Information would be collected, and three or four warnings would be issued to farmers. Instead of all the Colonies buying material separately, they would purchase in conjunction with each other. To show how necessary was such a co-operative movement, he instanced how the poison had risen in price from £20 to £40 a ton in the course of eight or ten weeks. It was necessary for farmers to let him know when locusts were laying their eggs, in order that the pest could be coped with more readily.

The mover said that, in view of what Mr. Fuller had stated, he was prepared to withdraw his motion.

Mr. Mitchell reminded them that the present Government might soon be put out, and the next Government might hold very different views.

The motion, on being put to the vote, was carried.

INDIAN IMMIGRATION.

Mr. B. B. Evans moved, on behalf of the Mid-Illovo Farmers' Club:—"That the notice of Government be drawn to the increasing amount levied by the Indian Immigration Trust Board of Natal on indentured Indians, which appears to be excessive and unjust, and to the advisability of all meetings being open to the public."

He thought it was desirable that the Government should inform them why the amount levied by the Board had been increased. He considered that there should be more forthcoming from the reports of the meetings.

Mr. Alexander explained the reasons of the increases in the fees. There were shiploads of Indians going back to India; and the Health Officer had directed that hospitals be erected everywhere. These hospitals cost money. The position of the Board was being safeguarded by some of the biggest employers of Indian labour in Natal. No more was being spent than was found actually necessary. Private persons could always obtain such information as they required regarding the Board by writing to the secretary.

Mr. Woods said that the increasing fees charged by the Board would prove beneficial to the Colony. Let them be raised higher and higher, until they were compelled to fall back on native labour. Then the Colony would prosper.

The motion, on being put to the vote, was lost.

The evening sitting on the 11th April was devoted chiefly to hearing the views of the delegates from the Natal Closer Settlement and Reform Association (Messrs. F. S. Tatham, Nelson Palmer, M.L.A., and L. H. Greene) on the question of

LAND SETTLEMENT.

Mr. Tatham, who first addressed the meeting, expressed the thanks of his Association for the opportunity given them of addressing the Union. He regretted that in the resolution which had been passed by the Union regret was expressed that the Natal Closer Settlement and Land Reform Association had not approached the various farmers' associations in Natal with a view to obtaining their support. He said it was perhaps a mistake in tactics, but it was not due to a desire not to secure their co-operation. There was no antagonism whatever on the part of their Association, and there should be none whatever existing between the rural and urban interests in the Colony. The interests of the people of the country were the interests of the people of the towns, and the farmers' success meant the success of the townspeople. While they in the towns might criticise the farmers from the comfort of a Maritzburg arm-chair, it was possible they might know nothing whatever of the difficulties which surrounded the farmers' occupation in this country. (Applause.) If this criticism did nothing else, it set people thinking; and if their criticism did nothing else, at least the expression of these ideas would lead to their receiving correction at the hands of the farmers. (Hear, hear.) He addressed them on what his Association considered to be a disease which was afflicting the Colony in reference to land settlement. They called this a disease: that was the right word to use. Men were leaving the country by hundreds. In Natal, Colonists who had been born and educated in the country were leaving it. He knew of several young men, desirable Colonists in every sense of the word, belonging to only two families, who had been forced to leave Natal because they could not get land. He knew of one of the best-known farmers in Umvoti County, living in Greytown, whose sale was advertised in the public newspapers, and he was going to New Zealand.

They could not afford to lose white men from the Colony. (Hear, hear.) On this they were all agreed. It meant death to the Colony. They might disagree about the remedy, but they at least agreed upon this point. If they studied the Customs returns for the last thirty years, they would find millions of pounds' worth of foodstuffs imported into Natal for consumption by her people. Travel over this country in

any form and what did they find? Thousands and tens of thousands of acres of ground lying absolutely idle, calling to Natal people for cultivation and development. It was a lasting disgrace to the people of this country, and those in the towns shared the discredit. That a single ounce of foodstuff which this country herself could produce should pay duty to enter it was a lasting disgrace to the Colony. Men who were willing to work the land, which was crying to be worked, were leaving the country because the land was not available to be worked. It was because they felt strongly that the true prosperity of the country springs from its soil, that the backbone of national wealth was its agricultural development, that they felt it their duty to bring the question permanently before their fellow-colonists, for thought if not for action. Could there be anything more impotent in the whole range of legislation than the existing land laws of Natal? He did not think so. They had on their statute book an Act which was called the Agricultural Development Act. The thing was worse than nothing at all, because it was a make-believe—a thing which makes people believe that a certain state of things exists, when in point of fact it was worse than nothing at all. The Agricultural Development Act of this Colony was utterly useless for the purpose for which it was designed. He was not going to weary them by a dissection of the Act. One of the provisions of the Act was the establishment of the Land Board. He wondered whether anybody, who was not a farmer, had heard of the Land Board? What did it do, and what had it done, to make its promise and work really felt in the Colony?

Their little Association, consisting as it did of a handful of uninfluential but earnest men, had issued without any authority whatever an invitation to the young men of this country to state what their requirements and qualifications were in reference to the occupation of the land. He was absolutely amazed at the response which they had received. They had received scores of letters, not from wasters and street corner and bar loafers, but from sons of the people. It was there where the Act failed. That Act was useless on their statute book. It was true a settlement had been started in terms of the Act. He referred to Winterton. Did they know what Winterton had cost them? Was Winterton worth the money?

Land was of no use to anybody until it was put to the service for which the Creator designed it—cultivation. The most desirable land was of no more use than the Sahara until man's labour was placed upon it. Increased production did not mean injury to anybody: it meant increased prosperity to everybody. Every blade of grass that grew, every atom of corn that found its way to the market, was so much wealth, not only to the man who produced it, but also to the country wherein it was produced. Increased production would mean increased markets for them.

The ideas of his Association might be crude and impracticable; they might be outside the range of practical politics; but if they had done no more than set the people of this country thinking, perhaps they had done some little service.

Mr. Nelson Palmer next spoke. He said this agitation had started in Maritzburg in connection with the growing exodus of white population from Natal. The supporters of the movement were being told that, in advocating closer settlement, they were advocating something altogether inapplicable to the needs and possibilities of Natal. It was said that closer settlement does not suit Natal. They did not propose "three acres and a cow" in Natal. Closer settlement was a very elastic term. In the President's address he held out no great inducement to intending settlers. He told them that Natal was a terrible country. It was rather strange, Mr. Palmer said, that such a statement should be made and sent forth to the world at a time when they had just been illustrating, in an exhibition in London, what a grand Colony Natal was. But in an official pamphlet issued by the Government—"Notes on Agriculture in Natal"—they had agriculturalists of authority and influence admitting that in various branches of farming in this Colony it was possible for men to make a success, provided they had energy and a determination to succeed. Mr. Alexander had contributed an article on dairying to that pamphlet, from which Mr. Palmer said he would read a short extract. "A large acreage of land," Mr. Alexander wrote, "is not necessary to carry on dairy farming successfully; but the farm must contain a fair amount of agricultural land that can be cropped, as well as good grass lands. A farm of from 500 acres to 2,000 acres would suffice to carry on dairy farming in a fairly large scale; and the intending dairy farmer with a knowledge of the proper management of cattle, how to grow food, how to feed and what to feed, and, above all, with steady perseverance, and the determination to make a success of it, has a splendid prospect before him in Natal." Then as regards fruit culture, Mr. F. Stevens had written in the same publication: "Viewed from all points, fruit-growing in the Midlands of Natal, as a business *per se*, is a thoroughly sound proposition to those who are prepared to invest in it a moderate capital and plenty of energy, combined with a fair amount of technical knowledge. Certainly it would be hard to find a pleasanter and healthier occupation." Again, in an article on potato cultivation, Mr. Graham Hutchinson had said: "Although we cannot expect the extravagantly high prices that have sometimes obtained during the past years, we may perhaps be spared the very low ones caused by a glut. With better railway facilities, and the constant increase in the population in towns, we should have a ready and more reliable market; and with the great advantage in our favour of nearness to those markets, should at least be able to stop the heavy importations that have prevailed of late. There is room for the expendi-

ture of more energy and capital in this direction, and the man who uses these with discretion, and is willing and able to work, should succeed."

They had gentlemen of experience telling them, Mr. Palmer proceeded, that in all these occupations they did not need a large acreage as long as they had energy. Let the Government offer inducements and facilities to white men to settle in Natal, and the country would reap a reward from such action. His Association proposed that any man who went on the land would have to satisfy the Government that he is of the sort likely to be successful. There were plenty of such men in the country. When they found such a man let the man be provided with the necessary implements. Where such men had nothing but their labour to put into their business, let them be provided also with food.

They knew that the prosperity of every Colony must depend mainly upon its agricultural resources; and it was because the agricultural resources of the Colony had not been developed in the past that they were suffering as they were doing to-day. The more the farmers suffered, the more did the people in the towns suffer, because unless a stable agricultural industry stood behind their commerce, the latter could not progress as it should. To those who said that Natal could not be a producing country, he answered that Natal had never been given the opportunity of showing what it could do.

Mr. L. H. Greene, in the course of a lengthy address, explained the objects of the Closer Settlement Association, and went on to show that closer settlement did not necessarily mean concentrated settlement. It had been found that the existing laws of the Colony provided almost everything necessary for the agricultural development of the Colony.

Mr. Alexander moved:—"That this Union, while desirous in every way of inducing a larger white population to settle on the land, is not in favour of placing men on the land on such a scheme as is proposed by the Closer Settlement Association, but requests the Government to remove the disabilities that prevent intensified farming being successfully carried on by small holders."

He thought that the Association was very much mistaken in many of its ideas. With all deference to Mr. Tatham, he did not think that gentleman had got up his case with sufficient care, otherwise he would not have advocated such a scheme as he had done. If the Closer Settlement Association would unite with the other agricultural associations of Natal and endeavour to get removed the disabilities at present hindering successful farming in Natal, they would be doing good. These difficulties were being removed. They had the export of mealies and fruit; and they had, still more, the sympathetic attitude of the Government in the matter of the eradication of diseases amongst stock. There was a great deal more than they could estimate dependent upon the prospect of bringing settlers on the soil.

There was an aspect which he was afraid had been overlooked in connection with the proposals of the Land Reform Association. There was the fear of a yellow population. If the men placed on the land remained poor, which would probably be the case starting without capital, the children would be ill-clad and ill-fed. They would grow up in poverty themselves; they would not be able to marry with their own colour, and the result would be that they would take up with the kaffirs, and this would give rise to a yellow population. Let them look at the Cape and the Transvaal and see the condition of affairs there. They would find thousands of these people without flag or country. It was a very great danger, and it was a condition that did not exist in any other country.

In conclusion, he said he would do his best to fight against a by-woner population and the vice which would go with it.

Rev. Jas. Scott showed that Mr. Palmer proved, by his own figures, that there was no room for any more agriculturists in Natal.

Mr. Wood said that, until the labour problem was solved, there would be no chance for the "small" settler in Natal. There were thousands of coolies coming into the Colony. Let them do without these alien immigrants from India, then they would be able to consider the question of white settlement.

Mr. Mitchell said he lived near the lands in Alfred County which it was proposed to throw open for settlement. He could not see how a man could make a living with £300 capital. He would not be able to employ much labour. However hard he worked, he could not get all his land under cultivation. They must first get rid of the stock diseases and of fruit diseases, they must have fresh markets opened up for their crops and must get a reasonable profit. Then they themselves would most heartily welcome schemes for closer settlement.

Mr. Geo. Coventry said he had listened with interest to the speeches of the delegates from the Closer Settlement Association. There was one thing, however, he had noticed all through the speeches of Messrs. Tatham, Palmer and Greene: they had not touched upon the real cause of the exodus of population. The whole cause of the exodus was the native question.

Mr. Blaker hoped that the Closer Settlement Association would not drop small settlers in various parts of Natal without first studying the land and conditions.

Mr. Moon said that he owed his own prosperity to the Johannesburg market. If it had not been for that market, he would not have been there that day as a representative of his Association. The Johannesburg market did not exist to-day.

Mr. Alexander replied; after which Mr. Tatham thanked the Union for the opportunity it had given them of addressing its delegates, and for the reception which had been accorded them that evening. He

urged them not to pass any sweeping resolution which would condemn his Association altogether. The burden of the speeches he had heard that evening was that small farming in Natal was impossible. If they followed their arguments to their logical conclusion, then they must stop the expenditure of another sixpence in promoting closer settlement. In conclusion, he said unoccupied land was useless. The occupation of land in some form was better than letting the land lie completely idle.

Mr. Alexander's motion was then put to the vote and carried by 36 votes to 2.

DAIRY EXPERT.

Mr. Alexander moved, on behalf of the Richmond Road Association:—"That the Agricultural Union learns with regret from statements in the Press, that the Dairy Expert Department is to be abolished, and the services of the present holder of the office to be dispensed with. This meeting of the Union desires to place on record its disapproval of the abolition of the Department of Dairy Expert and begs Government to reconsider its decision, and further wishes to testify to the value of the work carried on by the present Dairy Expert, Mr. E. O. Challis, and the confidence those interested in the dairy industry have in that officer."

He said it was not necessary to lead a very great amount of evidence to show that the abolition was a great mistake. He knew as much about dairy conditions in Natal as anyone in the Colony, and he held that the proposed step was a serious mistake. After speaking in very appreciative terms of the value of Mr. Challis' services to the country, he said he trusted the Union would not sit still and see such an office as that of the Dairy Expert abolished on a matter of retrenchment. There were arguments in favour of retrenchment, but in this case it would be no true economy to have a cheaper man.

Other delegates spoke, each expressing hearty appreciation of the work that Mr. Challis had done.

The motion, on being put to the vote, was carried unanimously.

RAILWAY FACILITIES FOR STOCK.

Mr. Hosking moved, on behalf of the Royal Agricultural Society of Natal:—"That this Union considers that the time has arrived when more facilities should be placed at the disposal of stock-owners and others by the Railway Department for moving small lots of stock, and respectfully suggests that once a week, or oftener if required, consignors may have a chance of consigning stock in a cattle truck, partitioned off for the accommodation of small consignments of small stock, three days' notice always to be given to stationmasters concerned in order that the department may know when to provide the partitioned trucks."

Mr. Dick seconded, and the motion was carried unanimously.

A vote of thanks to the Chairman was passed; and the proceedings then terminated.

Agricultural Organisation in Natal.

GOOD PROGRESS.

FORMATION OF COMMITTEES.

THE ideas formulated at the recent Annual Conference of the Natal Agricultural Union relative to the organisation and export of some of our more important products are now assuming definite shape. During the month meetings have been held of those interested in the formation of co-operative unions to deal with mealies, fruit, and wattle bark, respectively; and, through the courtesy of Mr. Eadie, of Messrs. Duff, Eadie & Co. (who are performing the secretarial work in connection with the organisation of these unions), it is possible to present readers of the *Journal* with the latest information available up to the time of going to press.

MEALIE-GROWERS' UNION.

A meeting of persons interested in the formation of a mealie-growers' union was held on the 14th May. Mr. G. D. Alexander occupied the chair; and there were present: Messrs. E. W. Evans, James King, C. L. Lund, Thos. Hyslop, H. A. Light, John Moon, F. C. Colenbrander, R. W. Comins, W. L. Stead, H. Baker, and R. M. Archibald. Many letters had been received, expressing full sympathy with the objects of the Union; and the writers, in a number of cases, regretted that their distance from Maritzburg prevented their attendance at the meeting.

Draft rules and regulations were submitted to the meeting and discussed; and a provisional committee was then appointed, consisting of the following gentlemen:—Messrs. G. D. Alexander (chairman), T. Hyslop, C. L. Lund, and H. Baker. The duties of this committee will be to obtain members for the Union and report to a general meeting to be held later on, when the president, committee of management and the necessary officials will be appointed.

The official name of the Association, which is to have its headquarters at Pietermaritzburg, is to be the "Natal Co-operative Mealie-Growers' Union." The objects of the Union are "to encourage the growing of mealies, and to assist in every way the marketing of the mealie crop, either by export oversea, or to adjoining Colonies, or locally, to the best advantage, for the benefit of its members. To obtain, in quantities and at most favourable rates, such necessities as are required in the business of mealie growing; to disseminate information amongst members as to the conditions existing in neighbouring Colonies and other countries with regard to the mealie crops in such Colonies and countries, and in every way to foster and help the successful growth and

sale of mealies and any other farm produce that it may be considered desirable to deal with." Membership is open to "farmers, whether individuals, partnerships, syndicates, or limited liability companies, and to all persons directly interested, whether as buyers, shippers, or produce agents in the commercial handling of mealies, or other farm products, provided that a company, syndicate, or partnership may delegate one director or partner only to vote at the meeting of the Union. The committee hereinafter appointed shall consider and deal with applications for membership." Subscription has been fixed at £1 per annum, payable, in advance, on the 1st July of each year.

The officers of the Union will consist of a president and a management committee of three persons, to be elected at the annual meetings of the Union to take place in May. The committee will have power to transact all business on behalf of the Union, in particular—

- (a) To collect and disseminate information of value to the Union.
- (b) To represent the needs and wishes of mealie-growers to Government, the shipping companies, agents, dealers, etc.
- (c) To arrange for the co-operative purchase of necessaries for the benefit of members and the sale of the farm produce of members.
- (d) To institute or arrange for the inspection and grading and marking of all mealies delivered by or for members of the Union.
- (e) To make, rescind, and vary Bye-laws for the government of the Union, and for the better carrying into effect of its objects, and also rules for its own government.
- (f) To impose penalties for the breach of rules or bye-laws; subject, however, to a right of appeal to a general meeting of the Union.
- (g) To appoint secretaries and other officers.

Under the heading of "Duties of Members," it is laid down in the rules that "All members are bound in honour loyally to support the Union by selling their mealies or other produce that it may be decided to deal with thereafter through the Union, and from time to time advise the secretary in writing what quantity of mealies or produce they may have to offer for sale. Private sales shall, however, be allowed on the understanding that the usual commission on such sales shall be at once remitted to the secretary of the Union." Further, "each member shall mark his sacks used for mealies and produce for delivery through the Union, with a descriptive mark registered at the office and supplied by the Union. Each bag must be sound, and must contain full weight. Any loss through unsound bags or through mealies failing to come up to description under which they are sold shall fall on the supplier." Settlement for mealies and other produce sold through the Union will be made

immediately after receipt of payment from the buyer, less a commission of 2½ per cent. to go to the Union to pay expenses of management. The Union is to be responsible for bad debts, such losses being met by an assessment on suppliers in proportion to the produce sold through the Union. This provision does not, of course, apply to the private sale of mealies or other produce.

FRUIT-GROWERS' UNION.

A meeting of fruit-growers was also held on the 14th May, with Mr. G. D. Alexander in the chair. The following gentlemen were present:—Messrs. W. L. Methley, E. W. Evans, F. Stevens, J. C. Parker, Graham Hutchinson, Simmonds, P. J. Dickinson, E. J. B. Hosking, R. M. Archibald, F. C. Colenbrander, Jas. King, and F. Schiever.

It having been formally agreed to form a Fruit-Growers' Union, the following gentlemen were elected to comprise a committee for the purpose of drafting rules for submission to a further meeting of fruit-growers to be held later on:—Messrs. G. D. Alexander (chairman), Graham Hutchinson, F. Schiever, P. J. Dickinson, W. L. Methley, and F. Stevens. This committee is due to meet on Friday, 31st May.

In the course of the meeting, in reply to a question as to the relation between the proposed Central Fruit-Growers Union and the Natal Orchard Association, it was pointed out there was no reason why the two organisations should clash, that there was, in fact, every reason why the two should work together, as the new association would be concerned principally with a class of fruit which so far had not come within the purview of the Natal Orchard Association.

WATTLE-GROWERS' ASSOCIATION.

A large and representative meeting of wattle growers was held recently at the offices of Messrs. Duff, Eadie & Co. Mr. W. J. S. Newmarch occupied the chair; and among those present were:—Messrs. H. M. Balding, S. H. Chandler, John Marwick, R. H. Pepworth, Comins, W. N. Angus, C. Maxwell Hibberd, Rev. Jas. Scott, G. D. Alexander, Hunt Holley, and Fawcus. Letters were read from various gentlemen apologising for their inability to attend the meeting, but expressing their complete sympathy with the proposed organisation.

It was decided that the name of the association should be the "Natal Wattle-Growers' Association," and the following gentlemen were elected to comprise a provisional committee to draw up draft rules and regulations for submission to a further meeting of wattle-growers:—Messrs. W. J. S. Newmarch, Rev. Jas. Scott, Fawcus, Carbutt, Hunt Holley, G. D. Alexander, and Angus.

Rules and regulations have been drafted, and a meeting to consider them, and to appoint a president, vice-president, and committee, was called for the 18th May. Further information will appear in the next issue of the *Journal*.

In the provisional rules it is proposed that "membership of the Union shall be open to all *bona fide* wattle growers, whether individuals, partnership firms, syndicates, or limited liability companies, and to all persons directly interested; whether as buyers, shippers, or produce agents in the commercial handling of wattle bark, and to registered shareholders in wattle-growing companies; provided that no person whose plantation or plantations shall be of less extent than 100 acres shall be entitled to a vote at the meetings of the Union or to hold any office therein; and provided that a company, syndicate, or partnership may delegate one director or partner only to vote at the meetings of the Union." A committee, which it is proposed to appoint, consisting of five members, will consider and deal with applications for membership.

The committee will also, it is suggested, have power, amongst other things, to collect and disseminate information of value to the Union; to represent the needs of wattle growers to Government, the shipping companies, agents, dealers, etc.; and to institute or arrange for the inspection and grading of all bark shipped by or for members of the Union.

CO-OPERATIVE BACON FACTORY.

Accounts have recently appeared in the columns of the daily press of the preliminary meetings which have been held to discuss the formation of a co-operative concern for the organisation of the bacon-curing industry. In brief, it is proposed to form a company, to work on co-operative lines, with a capital of £10,000, of which £4,000, representing 8s. per share, is to be called up within three or four months. The Association will be known as the Natal Co-operative Bacon Factory.

The sub-committee and the general committee met at Messrs. Duff, Eadie & Co.'s offices on the 14th May, and discussed certain details in connection with the proposed bacon factory. A plan of the proposed building was submitted, with prices, and general approval was expressed of the general arrangement of the building. The main object of the meeting, however, was to discuss the desirability of getting all farmers to recognise the co-operative principle of the concern, in order that the factory might not come to grief from lack of supplies. It was strongly urged that, at the present position of affairs, it would be impossible to get farmers to guarantee any particular number of pigs to the factory, although all those in the Camperdown district had expressed themselves willing to supply pigs. Under these circumstances, it was decided to ask prospective suppliers to sign an agreement to the following effect:—"We, the undersigned, agree to support the above factory, as soon as it is established, by supplying pigs; and we also agree to give the management of the factory the first call on any pigs we may rear, at the ordinary market prices."

It is anticipated that the response to this undertaking will justify the committee in placing their full scheme before the Government with a view to definite arrangements being made for the raising of capital.



"CRIMSON GALANDE" PEACH TREE.
Grown by Mr. A. H. Bennett, at Winterton.



"ROYAL" APRICOT TREE.
Grown by Mr. A. H. Bennett, at Winterton.

POTATO EXPORT.

With regard to the export of potatoes, inquiries are being made with a view to ascertaining whether this staple cannot be included with mealies as an article of export to the United Kingdom. In all probability it will be included with mealies, together with other products to be dealt with later on by the Mealie-Growers' Union. At present, however, the object of the Union is to concentrate its efforts on one line of produce only, in order to make a success of that. Afterwards its scope will be widened to include practically all farm products as well as farm requirements in the shape of fertilisers and seeds.

Fruit Trees at Winterton.

OPPOSITE this page are reproductions of two photos of peach and apricot trees growing on the Winterton Settlement, which have been kindly supplied by Mr. A. H. Bennett, the Superintendent of Settlements. They show what can be done with good pruning, constant cultivation, and attention.

The trees depicted are a "Crimson Galande" peach, and a "Royal" apricot, and were both planted on 20th July, 1905. They were supplied by Messrs. D. English & Co., of Maritzburg.

In forwarding the photos, Mr. Bennett says that the holes were excavated in May, 1905, and were not filled in until the trees were planted. Two wheelbarrow loads of well-rotted kraal manure were mixed with the soil in the hole, and the trees were irrigated once before the rains, which did not set in until November 23rd. The land was frequently scarified with a peg-tooth harrow; and in December, 1905, a dressing of 300lbs. of lime to the acre was broadcasted and harrowed in. A severe hailstorm did much damage to the trees in January, 1906, the bark on the one side being completely torn off. In consequence, in the spring of 1906 the trees had to be severely pruned back, but, notwithstanding this, have made enormous growth this summer.

In the same orchard, the apples that have done well are the "Newton Wonder," "Stone Pippin," "Wainwright," and "Black Ben Davis." There are some 25 varieties of peaches, 15 of apples, 20 of plums, 12 of apricots, 5 of figs, 15 of pears, and varieties of medlars, cherries, currants, etc., all of which have had the same treatment.

Trees obtained from Australia, in an orchard not 800 yards away, have been left far behind, showing very stunted growth and weak limbs. Mr. Bennett says he would certainly not advise anyone going in for fruit tree planting to plant trees from oversea, as, from numerous examples to be seen in his district, he considers our own nurserymen's trees to be far better conditioned, and, besides, about forty per cent. cheaper.

Sisal in G.E. Africa.

SHADE AND MOISTURE CONDITIONS.

THE *Journal d'Agriculture Tropicale* for March contains a resume of an article appearing in a recent issue of the *Tropenpflanzer*, by M. L. Kindt, on the cultivation of aloes in German East Africa. At one time *Fourcroya gigantea* was, it is stated, practically the only species of aloe cultivated in that country, but, at the present day, its cultivation has been almost entirely abandoned; its comparatively low percentage of fibre, and the difficulty which existed as regards the extraction of the fibre from the leaves, being the chief reasons for its having to give way before the introduction of *Agave rigida* var. *sisalana*. This variety of sisal M. Kindt terms "green aloe," in contradistinction to "white aloe," the name that he has given to the variety *elongata* (known in its native country as henequin). The difference in colour between the two varieties, he says, is noticeable.

In the south of German East Africa, conditions of soil and climate are similar to those of the native country of *Agave rigida*, and the plant accordingly does well there. The north of the Colony, on the contrary, is moist, and even marshy in certain parts; the land is frequently inundated, and is impregnated with salt at each tide. Cocoa-nut palms abound, but they do not do very well: the roots are often choked by the water and the trees do not live a normal length of time. The nuts, too, fall to the ground before reaching maturity. In the northern part of the Colony it is under the shade of these cocoa-nut palms and in this marshy soil that the sisal lives and flourishes. It is even stated to grow to a greater size than in the dry soil of the south, and its cultivation is proving remunerative.

Nevertheless, though the leaves are longer than they are on plants grown in dry soils, they are slender, less firm in substance, and more easily bent; they are of a darker green, and there is absent from their surface the bloom that covers them when grown on our drier soils. Further, its adaptability to the conditions of shade and moisture is so complete that the plant undergoes a change in its habits. If, by reason of the decay of one of the palms, some of the plants have less shade, the development of the leaves is thereby arrested, and they finally only attain to two-thirds of their normal length. Also, a dry spell dries up the leaves, giving them a large, spiny point, thus resulting in a smaller yield of fibre.

The opinion, ascertained by M. Kindt, of the planters at Kitunda, was that the removal of the central flower stalk upon its appearance would prolong the life of the plant by one year: a period during which it would continue to yield leaves. The experiments, however, that have been made for the purpose of ascertaining to what extent this idea



FOURCROYA GIGANTEA.

Five-months'-old plants growing at "Leckhampton," Inchanga.

is correct, have been negative, the treated plants dying immediately, whereas those in which the flower stalk had been left lived another six or eight months.

A peculiarity about sisal that is cultivated in moist soils is said to be the lesser number of shoots it throws out. It would also seem that the fibre from leaves and plants grown in the shade and harvested during the rainy season is weaker than that obtained from plants having access to the sun's rays.

Intercalary cultivation has been tried at Kitunda between the rows of sisal, castor-oil and cotton having been tried principally and abandoned soon after. Cotton never prospered—probably, it is suggested, on account of the amount of nourishment required by the agave to the detriment of the cotton plants. However, sisal is considered in German East Africa to be sufficiently remunerative to merit full attention, without troubling about other sources of income.

On account of the abundance of off-shoots, no great importance is attached to the duration of life of the individual plants. It is considered sufficient to provide for the replacing of each of the old plants as it dies; and, for that purpose, it is best to plant an off-shoot in the middle of each square or rectangle formed by four aloes. This planting should take place during the rainy season that follows the first harvesting of leaves.

The "white" agave, or henequin (*A. rigida* var. *elongata*), also cultivated in German East Africa, has the advantage of yielding a greater percentage of fibre. The "white" aloe throws out fewer off-shoots than the "green," and appears to flower later.

The number of aloes to plant in order to prove remunerative appears, it is stated, to be between 300,000 and 1,000,000. With less than 300,000 plants the decorticating machines cannot be kept going without loss. With more than a million, on the other hand, the facilities, so far as German East Africa is concerned, for dealing with all the leaves are inadequate, and it is further not possible to keep the plantation weeded easily.

FOURCROYA GIGANTEA.—This important fibre-producing plant, to which frequent reference has been made of late, is generally regarded as being only suitable for the Coast districts and those immediately adjacent thereto. It will be a surprise to many to learn that thousands of these plants have been successfully grown by Mr. Robert Topham, J.P., on his property, Pentrich, just outside of Maritzburg. Pentrich is just on the edge of the Thorn country; and Mr. Topham states that he has never known the *Fourcroya* plants on his place to have been at all seriously damaged by frost. In all probability, this aloe could be successfully grown in any part of our Thorns.

Probable Yields of Crops, 1906-7.

PRELIMINARY ESTIMATES.

AN attempt has again been made this year to forecast the probable yields of certain of the most important crops grown in Natal. Whilst the available data upon which estimates can be made are not as extensive as could be wished, the thanks of the Department are nevertheless due to all those who have so kindly assisted by replying to the questions contained in the circulars sent out about a month ago. Such replies as have been furnished have proved of much value, and it is on the information contained therein that the following estimates have been made.

MEALIES.

In view of the efforts which are being made to organise a successful export of Natal mealies on a comparatively large scale, the estimates of the probable crop of maize are the most important. It is proposed to follow up the estimate which is published here with a further one to appear in the next issue of the *Journal*. This first estimate has been based upon a more or less number of replies; but, whilst it may be taken as fairly reflective of the situation, it will be of advantage to re-adjust it in two or three weeks' time on the basis of further information that it is hoped to receive.

In next month's estimate it will be possible to give the actual figures of the 1905-6 crop, but in the meantime, for the purposes of comparison, the estimates that were made in May, 1906, are given, together with the actual figures for 1904-5:—

	Actual Figures, 1904-5. Muids.	Estimated, 1904-5. Muids.	Estimated, 1906-7. Muids.
<i>Natal:</i>			
Coast Belt	61,954	45,100	94,000
Midland Belt	416,674	358,660	519,000
Upland Belt	213,556	291,740	282,800
Total, Natal	692,184	695,500	895,800
<i>Zululand:</i>			
Coast	8,306	9,360	3,500
Upland			7,000
Whole Colony	700,490	704,860	906,300

It will thus be seen that the estimated total yield for the whole Colony (inclusive of crops grown by natives) is under one million muids.

SUGAR.

In some parts of the country the season has been a favourable one for the production of cane, whilst in others the returns obtained have not come up to expectations. On the whole, as will be seen, the 1906-7 crop is a larger one than that from the previous season; and, according to some of the reports that have been received, the 1907-8 crop promises to give very good results. One correspondent (in the Alexandra Division) writes: "The growing cane, for the next season's crushing, is the finest we have ever seen for the past 27 years." The secretary of another large estate—in Inanda Division—says: "The next crop promises in every respect to be a record one for the Colony, should we have a modicum of rain during June, July and August. It is estimated by some that the crop will be close on 44,000 short tons."

The following is the probable output of sugar for 1906-7, as near as it is possible to estimate it upon the returns that have been received. The estimate of 100 tons for Lower Umzimkulu Division is very rough, and will, if possible, be verified before the next issue of the *Journal*:—

	Actual Figures, 1904-5. Tons.*	Estimated, 1905-6. Tons.*	Estimated, 1906-7. Tons.*
Lower Umzimkulu Division	96½	1,500	100
Alexandra Division	6,559	8,280	7,800
Umlazi Division	2,217	2,000	2,900
Inanda Division	15,389½	19,760	21,600
Lower Tugela Division	5,534	6,420	7,000
	<u>29,796</u>	<u>37,960</u>	<u>39,400</u>

* Short Tons.

TEA.

The production of tea will be seen to be somewhat less than that of the previous season. The figures for 1906-7 given here are as near an approximation to accuracy as it is possible to attain, all the biggest planters having sent in estimates. The estimate for 1906-7 is shown in the following statement:—

	Actual Figures, 1904-5. lbs.	Estimated, 1905-6. lbs.	Estimated, 1906-7. lbs.
Lower Umzimkulu Division	90,000	100,000	90,000
Alexandra Division	20,886	56,000	52,000
Lower Tugela Division	1,521,792	1,756,000	1,678,750
	<u>1,632,678</u>	<u>1,912,000</u>	<u>1,820,750</u>

WATTLE BARK.

Though a number of replies have been received to the Department's circular relative to wattle bark, it is not yet possible, until more infor-

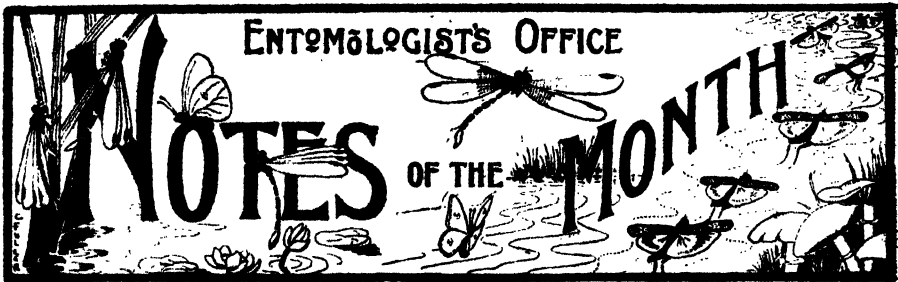
mation has been received, to form an estimate that would be at all reliable. From the letters which have so far come to hand, it appears that the season has been a very favourable one for wattle in most of the wattle-growing districts of the Colony, though there are some complaints that the amount of rain which has been experienced has interfered with the drying of the bark. Unfortunately, the "bag-worm" has done much damage to many of the plantations; whilst in the Richmond district the damage done by locusts has been serious and several hundred acres of young wattle trees have been quite destroyed by them, and will have to be replanted. Hundreds of acres of plantations, too, have been considerably damaged by the locusts, which appear to leave the mealie crops when they ripen and congregate in the young wattle plantations, destroying the young trees by eating the green shoots and the young bark, of which they seem to be particularly fond.

As far as can be seen, the yield of wattle bark this season will, on the whole, be greater than that of last year.

Those who have received circulars and have not yet replied to them are respectfully urged to do so at the earliest opportunity in order that the present estimates may be revised wherever possible, and also estimates made of the probable production of potatoes and wattle bark. It has not been possible to make estimates of the latter crops on account of the insufficiency of data available.

Fuller details relative to the principal crops will appear in the next issue of the *Journal*.

COTTON COMPETITION.—In the course of a paper on cotton supplies, in the *Economic Journal*, the authors, Prof. S. J. Chapman and J. McFarlane, comment upon the great change that has taken place in the sources of Great Britain's cotton supply during the last hundred years. In 1786 to 1790 the British West Indies contributed 75 per cent. of the total amount of cotton imported by Great Britain. The United States and India contributed less than 1 per cent., whilst the supply from Egypt was nil. During the period 1901 to 1904, however, the United States headed the list, supplying over 77 per cent. of the raw cotton imported into Great Britain. Egypt came next, with a little under 17 per cent. Here is food for reflection. In South Africa we have thousands of acres of land suitable for cotton. Once it has been practically proved that cotton-growing in South Africa will pay, more and more land will be put under it. The United States is said to be rapidly reaching a point when it will be able to consume all its own cotton, so that the British manufacturers are looking to Egypt, India, Africa, and Colonies in other parts of the world for future supplies.



Suggestions.

THE time is fast approaching for winter work in the orchard, and a great deal can be done during this season of the year to mitigate the various pests and diseases from which fruit trees suffer. The principle of "Out of sight out of mind" accounts for much in the aggressiveness of and amount of damage done by many an insect pest and most diseases of fungus origin.

Grape vines will need spraying with some fungicide. Peaches and apricots, pears and apples, all require a winter spraying with Bordeaux mixture to control such diseases as Black Spot, Shothole fungus, Leaf Blight, etc. Citrus trees require attention, too, because over the greater part of the Colony the winter is no check upon the propagation of scale-insects—indeed, upon the Coast, the season seems to favour them more than the wet summer months. All late fruits harbour fruit-fly, and none more than oranges. Consequently, all infected fruits should be carefully destroyed, and not left to rot on the ground.

For thorough spraying a good outfit is required. To-day we are talking of building up an export trade in certain fruits, but until all fruit-growers realise that the principal part of their avocation, as in all fruit-growing countries of any mark, is the continuous fighting, controlling and suppressing of insect and fungus pests, and until they take up that work thoroughly and in earnest it is useless trying to build up such a trade. The position to-day in Natal is that not more than one fruit-grower in one hundred is giving to his calling the serious attention that it calls for, is spraying and treating his trees as is necessary for their well-being, or is possessed of a decent outfit for doing the work.



AVOCADO BLIGHT.

Several correspondents have drawn attention to what is described as a new disease upon this popular salad fruit. An examination of the fruit offered for sale also indicates that the trouble has been quite common this season.

The fruits become affected when comparatively green, and the disease appears in the form of numerous pustules, which burst open usually in the form of a star-like crack with deep black or brown margins. In the cracks is often to be found a quantity of dry, white resinous matter. At times the disease takes the form of a large star-like cracking just to the one side of the apex of the fruit. When affected with the disease, I understand from several correspondents, the fruit falls before ripening and rapidly decays. In writing concerning it one correspondent states that whilst the fruit has been affected and fallen wholesale from one tree on a tree next to it the crop is beautiful and healthy.

Affected fruit kept under observation rapidly develops a form of ripe rot, the affected area being clothed with a thick layer of salmon-red spores. This rot can be easily introduced into ripening avocados by inoculation, but the characteristic cracking does not follow. It would seem that the disease gained an entrance through punctures in the rind of the fruit whilst still green. That the fruit on one tree should be attacked and that on another remain sound is possibly due to some difference in the nature of the fruits.

The falling of the fruit long before maturity is reached is not altogether unusual. Attacks on fruit of this nature cause a certain amount of metabolism, which weakens the attachment to the stalk.



BANANA DISEASE.

One of the most interesting matters which has been brought to my attention recently is a disease of the "lady's finger" banana. Writing under date of 7th April, Mr. E. J. Parsons, of South Coast Junction, says:—"I would ask your advice about a disease which is destroying the lady finger banana wholesale on the Coast. The disease takes the shape of a rust. The large plants gradually rot away and the suckers become stunted and do not come to maturity despite the fact that the soil is rich. I may state that it is only this variety which is affected."

As little was to be gained by correspondence, a short visit was paid to Mr. Parsons' plantation of two acres of this variety and his account of the disease confirmed. An examination of the roots of the diseased plants showed that the whole trouble was due to their decay. Affected

roots were brought away and were carefully examined, when it was found that they were grossly invaded with nematodes, a species of gall-worm similar in nature to that which affects the potato and causes galls upon the roots of many plants, particularly beets, parsnips, etc. This particular species seems very like one which causes a similar disease to tobacco in new land in certain parts of Natal, and I hope to be able to give the matter more attention. I am told on good authority that, whilst the pest does not affect any other kind of banana, it prevents altogether the successful culture of the lady finger; and, whilst it is at present premature to say so, I hope to be able to shortly devise some practical means of eliminating the pest from lands so that this variety can be grown successfully.



CABBAGE BLIGHT.

A cabbage blight which threatened to assume alarming proportions has been reported by Mr. J. L. Jaffray, Balgowan. In reply to certain inquiries, Mr. Jaffray writes: "The disease appears to attack the field in patches varying from 2 to 3 plants up to portions about 30 x 30 feet, or even larger pieces, although it is somewhat erratic, and a sound plant or even several may be found in the centre of a badly-infested patch, apparently quite free from the disease. Generally speaking, however, I should say the disease does occur in patches and spreads along the drills and outwards. I notice that the same disease (apparently) attacks the swedes growing alongside the cabbages, but only in a few cases does it actually kill the swede. On careful examination, I find that the young swede is partly rotted through just at the surface of the ground, although the top of the plants appears quite healthy."

I was unfortunately unable to make a personal examination of the affected area, and, from specimens of diseased cabbages submitted, was quite unable to identify the disease. It appeared to be of a bacterial nature or else was a form of attack of that notorious cruciferous disease club root. The roots, however, showed no signs of attack. Generally speaking, where the blight was upon the leaves it had commenced either at the margins or on the edges of holes made by insects.

Mr. Jaffray was advised to carefully pull up all blighted plants over the field and carry them off in baskets and thoroughly burn them.

How the infection came about it is difficult to say, but it is not impossible that it was introduced in the first instance in the seed. Attempts to inoculate young cabbage plants from diseased plants have not yet been successful, but this may be due to the dryness of the affected material when received.

World's Rubber Production.

THE PROBABLE FUTURE.

THE *Board of Trade Journal* contains a precis translation of an article by Professor C. Warbing in the *Tropenpflanzer*, showing the conclusions he draws from the statistics of the world's production and consumption of rubber.

The total world's production of rubber during the year 1905-6 is stated to have been 67,999 tons, and the world's consumption, during the same year, 62,574 tons. Of this production, over one-half came from America, viz., 42,800 tons; about 23,400 tons from Africa, including the East African Islands, while the remaining 1,800 tons came from Asia and Polynesia. Of the 23,400 tons of African rubber, 4,500 tons were produced by the Congo State, 1,500 tons by French Guinea, 1,250 tons by Angola, 1,000 tons by the Gold Coast.

Brazil's production of Para rubber increases, on an average, 5 per cent. yearly. The Castilloa rubber production of Central America and Mexico has decreased rather than increased, while Ceara and Mangabeira rubber production has risen more than 100 per cent. in the last five years. The African production has risen 50 per cent. since 1900.

Ceara rubber production is stated to be capable of important augmentation in Brazil; and the East African plantations of this rubber will also greatly extend. In Africa, Ceara rubber, as well as Kikxia (Funtumia) rubber plantations are going ahead, but no larger output of wild rubber can be expected, as, in spite of all regulations, most of the *Landolphia liana*, as well as a good deal of Kikxia, have been cut down.

As regards the carrying-on of rubber plantations, Africa, and especially Asia, have a great advantage over America, on account of better labour conditions. In view, therefore, of the small increase of the wild rubber output compared with that of plantation rubber, it is a question how soon the supremacy in the world's rubber production may be shifted from America to Asia, whilst Africa will take second place, America being finally surpassed.

The wild rubber, it is stated, will soon be a negligible quantity compared with plantation rubber. It is the starting of rubber plantations which will be of value; they must not, however, be too close together, otherwise the difficulties in connection with labour will be increased.

In the course of a lecture at the Ceylon Rubber Exhibition, 1906, Mr. Herbert Wright said that, presuming that the demand for rubber should increase at the rate of 5,000 tons of wild rubber a year; that each tree of a plantation yields only $\frac{1}{2}$ lb. a year, and there are 150 trees to an acre; that 5,000 tons of wild rubber equal in caoutchouc contents

4,000 tons of plantation rubber, and that the supply of wild rubber remains constant at 60,000 tons per year; then it follows that in ten years' time the cultivated area required will be only 960,000 acres.

But the Indo-Malayan region alone has planted 250,000 acres in rubber. Large concessions have been granted for rubber planting in Africa, South America, Central America, West Indies, etc. This calculation is based on the minimum yield per acre; a higher yield would mean a reduction in the cultivated acreage required. If the increase in consumption is much more rapid, then the prospect for the cultivation of rubber in the tropics is probably considerably brighter.

Death of Dr. Hutcheon.

It is with sincere regret that we have to record the death of Dr. Hutcheon, M.R.C.V.S., the Director of Agriculture of the Cape Colony, which took place at his residence at Maitland at 11 a.m. on the 14th May.

Dr. Hutcheon was one of the landmarks of South African agriculture. He was one of the best-known personalities in Cape Colony; and his geniality and courtesy made him an ideal Head of a Department. Since the re-arrangement that took place in the Cape Department of Agriculture (as a result of the findings of a Commission which inquired into its working), Dr. Hutcheon has most ably carried out the arduous duties of Director of Agriculture, long prior to which time his reputation had spread over the length and breadth of South Africa as the able Chief Veterinary Surgeon of the Cape.

For many years he has devoted his best energies to the forwarding of the interests of stock farmers; and in his difficult tasks in connection with the eradication of redwater, rinderpest, and other stock diseases, and the combatting of the various insect pests affecting the vineyards of the Cape, he performed yeoman service.

By the death of Dr. Hutcheon South Africa has lost one of her pioneer workers in the sphere of agriculture, and the void will be felt by all the Colonies and States which comprise the sub-continent.

This Department respectfully tenders its sympathy to the Cape Department of Agriculture in its loss of a friend, fellow-worker, and chief.

The funeral of the deceased gentleman took place on the 16th May, in the presence of a very large gathering.

Experiment Farms.

CENTRAL EXPERIMENTAL FARM, CEDARA. FARM MANAGER'S REPORT.

HAY-MAKING has been one of the chief operations of the month, but the weather being unfavourable the work was not carried out as expeditiously nor as satisfactorily as it otherwise should have been. Rain fell almost regularly every day, causing a lot of interruption in the work and necessitating extra handling in order that the hay might be properly cured before stacking. Every precaution had to be taken to protect it from the elements, and by the end of the month a considerable quantity was stacked, the greater proportion of which was of good quality. The following crops have been harvested, viz.:—Millet: a portion was cut green and formed part of a mixture for filling the silo, and the balance left to ripen for hay. Soy beans were cut from the "Distance of Planting" maize section and threshed. Buckwheat and linseed were harvested from the catch-crop section; and harvesting was commenced on another section of potatoes. Rye and barley were planted, and ground ploughed and prepared for experiments in growing wheat.

The filling of the silo occupied a considerable portion of the month, and all available material suitable for ensilage was utilised, maize, of course, predominating. The process of cutting and filling the silo was witnessed by a large number of farmers, who were visiting the Farm with their respective associations. Many of them exhibited a very keen interest in the cutter and blower and were agreeably surprised at the moderate cost (about £33 landed here), a few expressing their intention of purchasing one for their own use. Some of the farmers expressed their surprise that so powerful an engine should be required to drive the cutter and blower, so that it became necessary to explain to them that the traction engine was originally purchased for heavy traction in cultivation and was the only one available for the purpose; hence the apparent waste of power, which was inevitable under the circumstances.

With the exception of three lambs and a foal, all horses, mules, cattle, sheep and pigs were reported well and free from sickness at the end of the month, and all had been either dipped or washed and were free from ticks and otherwise clean. The following is a synopsis of the work carried out during the month, in all of which the students have been employed in a greater or lesser degree:—Cutting millet on Western Vlei, part of which was converted into ensilage and the balance into hay; cutting maize on Cultivation Section and converting it into ensilage; harvesting soy beans on "Distance of



CUTTING ENSILAGE AT CEDARA.

Planting" maize section and threshing same; cutting maize and millet on Rifle Range Paddock; harvesting buckwheat and linseed from catch-crop section; harvesting potatoes commenced on A/06 section; planting rye and barley; hay-cutting, carting and stacking; cleaning upper part of main avenue and removing grass; preparing football ground for students, and generally cleaning up round College and various buildings; ploughing and cultivating land for barley and wheat; cutting drains on Eastern Vlei; weeding catch-crop section; emptying, cleaning and refilling the dipping tank, and dipping cattle, 67 of which were for residents of the district; making forcing frames; and planting rhubarb, celery, asparagus, and onions.

ALEXANDER REID,
Farm Manager.

SCHOOL OF AGRICULTURE: HOUSE MASTER'S REPORT.

TO DIRECTOR EXPERIMENT STATIONS.—

During the month six students have come into residence, making our total up to 29, while I expect two more shortly. This will bring our numbers up to 31, which reaches the limit of our present accommodation. Three days' holiday from Thursday night to Tuesday morning were allowed to the students at Easter, though a few had to be kept back to carry on the necessary work on the Farm. Two students were sent down to Weenen with you for a week to receive instruction in handling the tobacco crop. At the end of last month Farrier-Sergeant Meares, of the N.P., came up to inaugurate a series of demonstrations in farriery. This will now be continued at least fortnightly, and will prove of great assistance to the College. The Government Entomologist also came up during the month and gave us the first lecture of a course on entomology, illustrated by some lantern slides. The ordinary course of lectures, demonstrations and field work has gone on as usual. A Rugby football ground has been made, and we should have the makings of a good team when we have practised together more. At Easter two examinations were held, one on the "Principles of Agriculture" and one on "Management of Stock." I am very glad that you were able to report that, on the whole, you were satisfied with the work of the students as shown by the results of their examinations.

C. W. HANNAH, M.A.,
House Master.

WEENEN.

TO DIRECTOR EXPERIMENT STATIONS.—

Since taking over my new duties here on the 1st April my time has been principally devoted to the harvesting of tobacco and the curing of same in the new barn recently erected for that purpose. As you are well aware, this work requires constant attention night and day, from the

time the fires are started until the tobacco leaf is found to be sufficiently cured. I can report favourably on this, the preliminary trial of the only fire-curing tobacco barn in Natal at present, although slight alterations and additions will have to be made, as found necessary, so that the best results may be obtained in the colouring process. Many farmers have visited the Station to inspect the barn, and appeared favourably impressed with the idea of being able to cure a marketable tobacco on the Settlement. Several enquiries are made *re* conditions of purchase or otherwise of tobacco leaf which may be grown on the Settlement during the next season.

Planting operations have been carried out with no little difficulty, owing to all the available labour being required at certain periods on the tobacco, but the harvesting of this experimental crop is now practically completed, and more attention can now be paid to the planting of winter crops.

The following have been organised during the month:—The Drainage Section, comprising four plots approximately half an acre each, planted with lucerne, barley, oats, and rye. This is an experiment to test the effects of draining, one-third of the section being undrained, one-third tile drained, and one-third with open drains; these again being divided into two equal parts, one being irrigated and the other un-irrigated. Section A, approximately five acres, has been divided into ten equal plots and planted with six varieties of oats, two of barley, and two of rye. The grass paddock has been ploughed and re-sown with a mixture of grasses, viz., Italian rye, Perennial rye, Kentucky blue, Canada blue, and Sweet vernal. The rye grass is showing well above ground at time of writing. Part of the land for truck crops has been ploughed, and a start has been made with the celery trenches. The nursery ground is being prepared a second time, and, after the necessary measurements are made, the various varieties of plants and seeds will be planted.

The new grading implement which was being constructed by the late Curator, Mr. McPherson, is now completed, and I forward herewith, for production in the *Journal*, a photograph of this machine at work on the lower land, as I think it would be instructive to the public, and especially to irrigation farmers.* The land in the background has been graded. This implement does good work and only requires eight to pull it, and can be made by any handy man at no great expense.

Twelve boys from the Government School, accompanied by the Headmaster Mr. Pardy, visited the Farm on the 29th of the month, and received a practical demonstration in the working of the "buckeye" seed drill, also a short lecture on draining of land, with an ocular demonstration of what is being done here.

* NOTE.—The illustration referred to will appear in the next issue of the *Journal*.

Rain fell on 10 days, and totalled for the month 2.66 inches. Light rains such as we have had are very acceptable at this time of the year, as it reduces the work of irrigating the newly sown crops to a minimum. Live stock is healthy.

W. HOSKING,
Curator.

WINKEL SPRUIT.

TO DIRECTOR EXPERIMENT STATIONS.—

The month of April came in wet, and the rainfall registered, viz., 7.20 inches, was a heavy one, and brings the total for the first ten months of the year (starting from 1st July, 1906), up to 43.33 inches. With the exception of the cowpeas, which are showing a good deal of blight, all the crops have largely benefited thereby.

The seed potatoes (Up-to-Date) which you sent from Cedara were planted, and are well through the ground, and should in ordinary conditions produce a fair yield. Sections formerly planted with Northern Star potatoes and oats have been ploughed and planted with red Natal beans; including these two sections, I have about nine acres planted with these beans, and all are growing profusely. Onions, rhubarb, celery, and asparagus were also planted in seed beds, and, with the exception of the last-named, are making fair headway.

Cow peas planted between each second pair of rows of maize (lima beans being planted between alternate pairs) on the Distance of Planting Section have been harvested and threshed, and resulted in a total yield of 226lbs. of clean seed. This section contains four plots, A, B, C, D. Plot A, 24 rows 6 feet apart; Plot B, 24 rows 5 feet apart; Plot C, 24 rows 5 feet apart; and Plot D, 24 rows 3 feet apart. The following are the results tabulated:—

Plot.	No. of Rows.	Width between the rows.	Total Yield.	Pods.	Grain.
A	24	6 feet	948 lbs.	132 lbs.	74 lbs.
B	24	5 "	1,268 "	142 "	80 "
C	24	4 "	621 "	82 "	45 "
D	24	3 "	450 "	43 "	27 "

From this table of results it will be seen that Plot B has given a better yield than Plot A, notwithstanding that in Plot A the plants had an extra foot of ground to grow in. This can only be accounted for in one way: Plot A is on lower-lying land than Plot B, and the greater portion of its soil is a fine black loam, whereas on Plot B the soil is a light sandy reddish loam, and must be more suitable for this kind of crop. A very marked difference was noticeable in Plot D, where the rows were only 3 feet apart. The plant was drawn up very high and developed into a thin weedy-looking bush, whereas on Plot B the plants were of a low spreading nature with a dark green luxuriant foliage and

strong, healthy pods. There was also a great contrast in the grain from these two plots, the one being well developed and fleshy and the other thin and shrivelled up, thus proving that the cow-pea requires plenty of room, light and air to properly mature in.

Maize from Manure Section has been harvested, and results will be forwarded to you in the course of a day or two.

The maize crib has been finished and is capable of holding about 500 bags of grain. A photo of the building was delivered to you on the 19th inst.*

W. JOHANSEN,
Manager.

Laboratory Report.

DETERIORATION OF TEA LANDS.

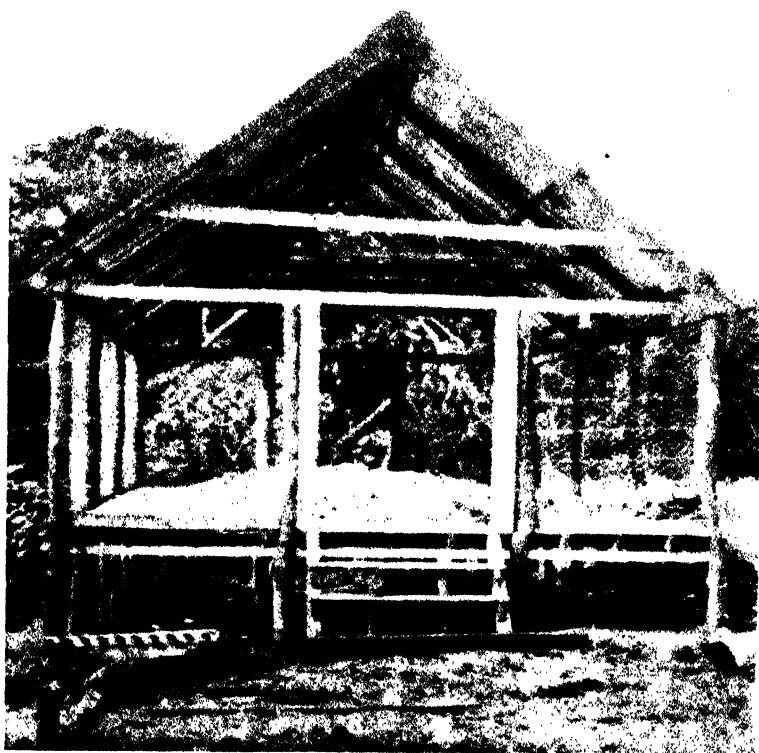
In connection with the question which has been raised as to the condition of some of our Natal tea soils in regard to their production of good healthy plants, four samples of soil forwarded by Mr. W. A. Gilbert, of the Barnsdale Tea Estate, Ifafa, have been examined in order to find out the relationship in which they stand in respect to their chemical and physical properties with a view to discover if possible the cause which has exerted an influence on the quality of the plants grown on these soils.

The four samples represent respectively No. I., the surface soil taken from the immediate vicinity of a poor tea plant, showing every sign of depreciation in growth and colouration and carrying yellow foliage; No. II., the subsoil of the above taken to 20 inches deep; No. III., the surface soil from the immediate vicinity of a healthy flourishing tea tree with dark foliage; No. IV., the subsoil of No. III. taken to 20 inches deep.

These samples when subjected to chemical examination were found to contain respectively:—

	I.	II.	III.	IV.
Reaction	Neutral.	Neutral.	Neutral.	Neutral.
Moisture	4.87	11.24	5.78	4.25
Loss on Ignition	8.30	7.10	6.71	4.20
Insoluble Matter	76.17	62.09	80.38	85.86
Silica	0.30	0.24	0.15	0.08
Phosphoric Acid	0.03	0.04	0.02	0.05
Potash	0.22	0.20	0.12	0.11
Lime	0.25	0.15	0.13	0.10
Magnesia	0.21	0.42	0.10	0.05
Sulphur Tri-oxide	0.06	0.02	0.04	0.04
Iron and Alumina	9.64	18.50	6.63	5.32
Chlorine	0.002	0.001	0.001	0.001

* Reproduced in this issue.



MAIZE CRIB, WINKEL SPRUIT EXPERIMENT FARM.
Constructed of Native timber, galvanised iron, and poultry netting.

Soluble in Weak Citric Acid.

	I.	II.	III.	IV.
Phosphoric Acid	0.0038	0.0005	0.0031	0.0015
Potash	0.0180	0.0064	0.0098	0.0080
Humus	1.12	0.80	3.62	2.44

These figures present some very important information and differences in regard to the chemical side of the question. They reveal the fact that Phosphoric Acid in all the samples is very low; some authorities consider that there is no necessity for more than a moderate or even a small proportion of Phosphoric Acid in tea soils as the period of growth and root system are extensive and that the plant has the power of making use of the more insoluble forms of this constituent, but the amounts present in these soils would appear to be too low even for tea soils. The amounts soluble in a dilute solution of Citric Acid would further support this view and indicate the advisability of supplementing the soil's store.

Potash is much more favourably represented as shown both in the total and available quantities, but as the ash of the tea leaf contains about 20 per cent. of Phosphoric Acid and 38 per cent. of Potash, in all 58 per cent., or over half its weight of these two constituents, it is reasonable to suppose that there is necessity for at least a moderate supply in the soil.

Lime and Magnesia are in good proportion throughout so far as their chemical presence necessitates, with the exception that there is a slight falling off towards No. IV., more especially in regard to Magnesia.

The difference in the amounts of humus are especially noticeable when Nos. 1 and 2 are compared with Nos. 3 and 4. The organic matter of soils, both in its partial and more perfect states of decomposition, has a very intimate and at the same time many-sided influence on a soil's fertility, aiding, as it does, the release of fertilising matters from the soil, besides parting with its own plant food and exerting a beneficial action on the soil moisture and other physical properties inseparable from high productiveness. In the process of reduction humus is formed, this in its turn forming the source of organic Nitrogen to the plant, and herein lies one of the great dissimilarities between these two soils and their subsoils. In No. 2 especially the amount of humus falls very low, the source of soil Nitrogen is thereby limited; it has frequently been observed that lack of Nitrogen induces an unhealthy and yellowish appearance to plant foliage, and it is very probable that the want of freshness and greenness in the leaves of the tea plant can be attributed at least to some extent to this cause.

Reviewing the soils from their physical and mechanical aspects even a superficial observation was sufficient to detect differences in the

appearance of these soils. Nos. 3 and 4 had a nice friable feel and were dark in colour, No. 1 was somewhat lighter in colour due probably to its lesser amount of organic matter, while No. 2 (the subsoil of No. 1) was altogether different in colour, grain and general appearance, seeming to be purely oxidised and much disintegrated ironstone mixed with clay and almost devoid of organic matter. When placed under the influence of water the pieces of ferruginous material of which it consisted were partly broken down into a greasy yet gritty mass.

Further investigation of the physical and mechanical conditions of the soils fulfilled a promised interest in that they showed variations quite equal to those portrayed in the chemical comparison. They were separated by mechanical means into their various grades or sizes of soil particles and the percentage of each ascertained. These were as follows:—

	I.	II.	III.	IV.
Stones	1.62	26.66	—	—
Fine Gravel	8.24	13.95	3.22	6.62
Coarse Sand	31.05	29.09	32.05	39.29
Fine Sand	29.72	17.93	29.46	26.72
Silt	12.09	3.26	11.92	11.94
Fine Silt	6.84	1.27	11.21	8.48
Clay	1.44	0.51	4.02	2.08
Loss on Ignition	9.00	7.30	8.12	4.87
	100.00	100.00	100.00	100.00

There is a close resemblance throughout between Nos. 1, 3 and 4. In No. 1 the proportions of finer materials are somewhat smaller, but in No. 2 the coarser particles distinctly predominate, and from fine sand downwards the contrast is very marked. The presence of a good supply of the finer portions of a soil is important to plant growth, and the unsatisfactory condition of No. 2 in this respect must necessarily operate against its ability to function as a good growing medium.

The drainage in Nos. 3 and 4 was very free, especially in the subsoil, but in No. 2 contact between the dry soil and the water caused a swelling and disintegration of the material, with subsequent delay in the passage of the water through the mass.

Another difference between No. 2 and the other soils was displayed in their comparative powers of capillary attraction. The rise of water in specified periods of time in the field samples were found to be—

	I.	II.	III.	IV.
In 6 hours	8.3	6.5	8.9	7.1 inches.
In 24 hours	10.5	8.2	11.0	9.9 inches.
In 72 hours	13.5	10.0	12.3	12.5 inches.

showing that at the end of each period No. 2 lagged behind the others. This capillary power is influenced by the size of the soil particles, and the amount of organic matter present, and in the above experiment the

results are in agreement with the facts previously ascertained. Capillarity has to do with the passage of water through the soil, and in this respect it is important in tapping the large supply of underground water which can permeate upwards through the soil until it reaches the surface layers in which the plant roots are established, and thus provide them with a source of moisture apart from that falling naturally on the surface.

The proportionate water capacity of these soils was found to be approximately in cubic centimetres per cent. 37.50, 39.05, 39.80, and 44.30, which means that 10 lbs. each of the respective soils held when saturated with water 3.7, 3.8, 3.9, and 4.4 lbs. of water. This property is due in part to the size of the soil particles, but to a greater extent to the amount of organic matter present. There is less variation shown in this respect among the soils, but the capacity of No. 2 appears to be governed by different properties than are displayed in either of the others.

The deductions from these investigations may reasonably be taken to indicate in the first place the need of a dressing of a phosphatic manure in all the soils. In No. 2 this is more apparent in regard to the amount of available phosphoric acid in the soil, although the total amount present is similar to that in the other soils. The effect of the presence of so much iron has been to fix the phosphoric acid so firmly that only a small portion of it can be said to be available. The addition of lime to this subsoil would also seem to be advisable.

There does not appear to be the same urgent need of Potash, yet the proportion present falls rather low in some of them, more especially the available quantity in No. 2, and it would seem to be advisable to supply at least a small quantity along with the phosphatic manure.

The application of green crops turned in, especially the deeper rooted leguminous crops, is likely to prove of great advantage in these soils, and should at least be attempted in Nos. 1 and 2 soils. No. 2 is a faulty subsoil, and the application of a green manure, accompanied by liming, should go far to remedy its unsatisfactory condition.

ALEX. PARDY, F.C.S., etc.,
Analyst.

QUALITY OF SEEDS.

THE results obtained from the examination of the many seed samples dealt with by this branch have shown somewhat interesting and varied results. Frequently they have proved very unsatisfactory, and go far to confirm the need of exercising care in the selection of good, sound, healthy seed.

Two samples of wheat, No. I. Clawson Longberry, and No. II. Pride of Genesee, recently forwarded for report gave very satisfactory returns.

In two days 28 per cent. of No. I. had germinated, in three days 40 per cent. of No. I. and 15 per cent. of No. II. Within a week 80 per cent. of No. I. and 90 per cent. of No. II. had sprouted, thus showing the seed was fairly fresh and of good vitality.

A sample of Canadian Wonder beans subsequently received gave a return of only 5 per cent. in nine days; at the end of 14 days an average of only 15 per cent. of germinated seed was obtained. The beans, although still retaining their gloss, had a lack of freshness and plumpness, and were as a sample rather undersized, requiring 850 seeds to weigh a lb. These appear on examination to be old or badly kept seed, which, instead of giving a return of some 95 per cent., only averaged 16 in fourteen days. They may be regarded as a comparatively worthless lot and costly at any price, their want of vitality and miserable germinative powers rendering them unfit for seeding purposes. Such an example only emphasises the necessity of guarding against haphazard buying of seed, and, if possible, of obtaining reliable information as to the quality and soundness of the seed, or of determining their germinative value before sowing.

LIMESTONE.

The need of lime for our soils and the desirability of obtaining a cheap and efficient source was recently referred to in an article under "Limestones." Since its publication a very good stone has come to hand which promises to fulfil this want.

The stones were taken from the exposed surface of a deposit found in the Umvoti County. One of these when broken showed a very pretty surface at the fracture with its large grained marbled formation and clean white or bluish white appearance, giving promise of a rich limestone, which has been duly affirmed by analysis. This sample was found to contain over 91 per cent. of carbonate of lime, and 2 per cent. of magnesia. The other samples taken from the same district differed very much in appearance and structure; they graded down to a hard crystalline compact rock of a grey colour, in appearance not unlike an igneous rock. Each of the samples was more or less freely interspersed with small particles of pyrites, which on the exposed surfaces had become oxidised to the brown oxide of iron. The poorest of these stones examined gave a return of over 75 per cent. of carbonate of lime and 2 per cent. of magnesia; an average of the whole bulk was found to give 80 per cent. of carbonate of lime, so that if the parcel can be taken as a faithful representation of the deposit it augurs well as a source of future supply. The difficulty of carriage, I understand, has to be overcome, as the quarry is some distance from the railway, but it is hoped that means may be found to overcome this disability, and that those interested may find it possible to place a cheap lime on our railways.

It is quite probable that we have other yet undiscovered sources

in Natal, and a very simple test within the means of all farmers may be productive in disclosing those hidden treasures. A few drops of Hydrochloric (Muriatic) Acid, Nitric Acid or Citric Acid applied to a limestone produces effervescence; if the stone be broken or ground up and placed in a drinking glass, to which preferably Hydrochloric or Nitric Acid is afterwards added, an energetic effervescence takes place when the two come together, due to the liberation of the carbon dioxide from the stone which passes off as little globules of gas. This gives a very reliable test as to the presence of Carbonate of Lime, and it remains then to confirm this test by a laboratory examination in order to find out how much lime per cent. the stone contains so that its value as a limestone may be understood.

ALEX. PARDY, Analyst.

ROOT NODULES.

IN view of the disappointing results—the causes of which need not here be discussed—which have attended the importation of the prepared cultures of the nodule forming bacteria of the leguminous roots, it is proposed to prepare cultures for next season from local sources for a limited trial distribution in the Colony, in order, if possible, to introduce into our soils those minute organisms to which so much importance is attached in regard to their ability to enrich the plants in which they take up their abode, in nitrogen derived from the free gaseous nitrogen of the atmosphere.

We have in Natal a splendid field for observation and investigation as regards the effects of the presence of these organisms, and it is hoped that if their introduction can be successfully established they may prove a valuable and inexpensive means of enriching our soils in nitrogen.

To assist in the object of obtaining material for this purpose the Department hereby appeal to those farmers who may be fortunate enough to discover among the roots of their leguminous crops the little round warts or nodules which the bacteria give rise to, to give the Department the benefit of their find by sending on to the Analyst, Central Experiment Farm, Cedara, a small quantity, say 1 or 2 ozs. of the nodules. To collect the nodules it will be necessary to dig up the roots carefully—not pull them up, as the little bodies would thereby become detached—and then to free them of soil by washing or gently shaking. The nodules are easily recognised as round little bodies ranging from the size of a pin's head to that of a pea or even larger.

Those particularly desired are from such crops as peas and beans of various kinds, clovers, lucerne, vetches, and the more commonly grown crops. It will be necessary to carefully label each different lot with the name and variety of plant from which they were obtained, as this is important in respect to the application of the cultures.

East Coast Fever Restrictions.

UNDER the provisions of Act No. 54, 1906, certain restrictions have been placed upon the movement of cattle in respect of the Magisterial Divisions of Ladysmith, Babanango, Eshowe, and Nkandhla.

declared those portions of the Magisterial Division of Ladysmith lying to the east and west of the main line of railway to be infected areas

In terms of Section 3 of the Act, the Minister has declared those portions of the Magisterial Division of Ladysmith lying to the east and west of the main line of railway to be infected areas of cattle into or from, and all movement of cattle within, those areas. Notwithstanding this prohibition, however, healthy cattle are allowed to be moved within this separate infected area on permission in writing being first obtained from a member of the Local Committee appointed to issue such permits, or from the local District Veterinary Surgeon or Stock Inspector.

The whole of the Magisterial Division of Babanango has also been declared an infected area. A zone of country of an approximate width of three miles has been marked off with flags along the eastern side of the Nondweni River where it forms a boundary between the Magisterial Divisions of Babanango and Nqutu, from a point immediately below Woolmore's Store, up the river to its junction with the Babanango-Nkandhla Divisional Boundary; and the Minister has ordered that all cattle shall be removed from, and that no cattle shall be allowed to enter or be in such zone. Cattle straying into this zone are liable to be immediately destroyed without the owner thereof being entitled to compensation.

The Magisterial Division of Eshowe has been declared a separate infected area within the Province of Zululand; and the ingress, egress, or movement of all cattle, into, from, or within that Magisterial Division, has been prohibited. Notwithstanding such prohibition, the movement of cattle in yoke *bona fide* engaged in transport may be permitted along the Eshowe-Ginginhlovu main wagon road upon permission being first obtained in writing from the Stock Inspector or Magistrate at Eshowe, subject to such directions or limitations as may be imposed in the permission given.

The movement of all cattle within the Magisterial Division of Nkandhla, and also the ingress and egress of cattle into and from that Division, have also been prohibited. The movement of healthy cattle in that portion of the Nkandhla Division lying to the east of the Insuzi River from the border of the Babanango Division to the Tugela River will, however, be allowed upon permission in writing being first obtained from the Magistrate, Nkandhla.

The following Magisterial Divisions have been brought under the

provisions of Sections 7 of Act No. 54, 1906:—Paulpietersburg, Utrecht, Newcastle, Dundee, Vryheid, Ngotshe, Babanango, Umsinga, Ladysmith, Estcourt, Weenen, Lion's River, New Hanover, Umvoti, Krantzkop, Lower Tugela, Mapumulo, Ndwedwe, Inanda, Umgeni, Pietermaritzburg City, Camperdown, Richmond, Ixopo, Alfred, Alexandra, Durban Borough, Umlazi, Eshowe, Ngutu, Nkandhla, Entonjaneni, Ndwandwe, Lower Umfolosi, Ubombo, Hlabisa, Ingwavuma, Umtunzini, and Mahlabatini.

The section in question decrees that no person shall, under pain of contravention of the Act, remove or in any way interfere with any fence erected or maintained for any purpose connected with the suppression of East Coast Fever, whether such fence be his own property or not, unless he shall have first obtained the written consent of the District Veterinary Surgeon or Stock Inspector.

A Sugar Industry Agricultural Bank.

UNDER the provisions of an Act of Parliament passed last February, a Sugar Industry Agricultural Bank has, according to *Agricultural News* (Barbados) been established in Barbados. By the provisions of the Act, a free grant of £80,000 from the Imperial Parliament in aid of the sugar industry in Barbados, from which advances have hitherto been made to planters at 6 per cent. interest during the last five years, is transferred to an Agricultural Bank.

The consent of mortgagees, or due publication of intention to borrow, is required of owners applying for loans. The application of the loan is, except with the express permission of the Bank, limited to the general cultivation and management of the plantation. The loans will be a first lien against plantations, except liens resulting from certain previous Loan Acts in certain cases. The agricultural year is defined as from June 1st to May 31st in the year following. Loans previous to the beginning of any agricultural year can only be expended in artificial manures and the payment of taxes.

It is provided that the sugar, molasses, and cotton crops, on which a loan has been made, shall be sold in the island, and the amount of the loan has to be repaid, together with the interest, from the proceeds. The Bank is empowered to insure buildings, crops, etc., from fire, at the charge of the estate. Any sum due on account of a loan, after payment of the proceeds of the sale of the crops, is to be repaid in five annual instalments, with annual interest, commencing on August 1st of the next following year.

Locust Destruction.

IN the April issue of the *Transvaal Agricultural Journal*, the statement is made that, "next to the Transvaal, the O.R.C. and Basutoland have done more active work in connection with locust destruction than any other South African Colony." It is also stated that "it is very encouraging to see our sister Colonies taking up locust destruction so heartily, after the strenuous efforts made by the late Mr. Simpson to interest the rest of South Africa, and make an effort to wipe this pest from the country. Mr. Simpson lost no opportunity of presenting the need of locust destruction to the other Colonies, with the result that considerable interest is now being taken in the work, not only by the British territories, but even by the Portuguese Government."

The notes in question have evidently been written as though the writer thereof was ignorant of the existence of the Colony of Natal.

As far back as the year 1896, the Colony of Natal was taking very active measures in the destruction of locusts, a sum of no less than £10,000 having been spent in that year on their destruction. As far back as 1895, legislation was framed in Natal to provide for the extermination of locusts, to create the appointment of a Chief Locust Officer, to divide the Colony into locust areas, to compel people to destroy locusts on their own lands, and to enable the Government to destroy locusts on Crown Lands and unoccupied lands. This Act was amended in 1898, as a result of the experience gained in working under the 1895 Act. Every season Natal has continued its campaign against locusts; and again in 1901 further legislation was brought in as a result of the experience gained. As recently as 1904, the whole of the Locust Acts were repealed and re-enacted with further amendments suggested as a result of experience in the field.

About the year 1894 one of the Natal sugar planters, Mr. Gilbert Wilkinson, of Ottawa, experimented, and found that locusts greedily devoured arsenic sweetened with sugar—to their destruction. He advised others on the Natal coast to try the same method, and in every case it was proved eminently successful. This system of destruction of locusts by poisoning became more and more widely known, and gradually superseded all the antiquated methods of destruction by beating, by trenches and wire screens, etc., all of which, so far as Natal is concerned, were ultimately abandoned as valueless in comparison with the method of destruction by poisoning. The services of Mr. Wilkinson were publicly acknowledged by the Parliament of Natal by a presentation, which was made three or four years ago.

In view of these facts, it is astonishing to read in an agricultural journal published by a neighbouring Colony that, "next to the Transvaal,

the O.R.C. and Basutoland have done more active work in connection with locust destruction than any other South African Colony." The facts of the case are that Natal for years was combatting single-handed the locust plague while the neighbouring Colonies and States (as they then were) were doing absolutely nothing. Before the outbreak of the Boer War, the Natal Minister of Agriculture, the Hon. H. D. Winter, made the suggestion that the other Colonies and States of South Africa should be approached with a view to combined action in the matter of locust destruction. Unfortunately, the outbreak of the war put a stop to this project, but, as soon as matters had quieted down after the war, Natal again brought the matter forward, and it is largely through the exertions of this Colony and of our Government Entomologist (Mr. Claude Fuller) that the other Colonies and States are now using the same method of destruction by poisoning. When the late Mr. Simpson started on locust destruction in the Transvaal, he was well equipped with miles of locust screens; but his own experience of working with the screens, combined with a personal visit to Natal, convinced him that the Natal system was the only feasible one. The adoption of vigorous methods of destroying locusts in the other Colonies has generally been subsequent to visits paid by their officials to Natal, where they have been personally shown over the ground and have had the Natal methods explained to them. Legislation brought forward by the other Colonies has been based upon the experience gained in Natal, our shortcomings and mistakes acting as guides to our sister Colonies.

It is due to ourselves to place on record the priority of Natal, so far as South Africa is concerned, in both legislative and active measures for the destruction of locusts on a wholesale scale.

The Government Abattoir.

COMMENCEMENT OF OPERATIONS.

THE working of the new Government Abattoir at Maritzburg is now proceeding successfully and affording opportunities to everyone for dealing with cattle from East Coast Fever and other areas, thereby saving stock-owners from prospective losses from the ravages of the disease. A return of the results obtained from the first lot of cattle sent for slaughter purposes by one of the leading farmers in Umvoti County is interesting and instructive. After all expenses had been deducted (including commission for selling, and abattoir charges), the oxen, twelve in number, averaged £9 10s. per head. If these had been sold by public auction, on the hoof, the price would probably have been from £7 10s. to £7 15s. each. The carcasses realised £106 10s. 9d., the hides and

horns fetched £11 7s. 8d., and the offal realised £7 7s. The total charges, including auctioneer's commission, charges for killing, storing and packing, amounted to £13 7s. 9d.—or £1 2s. 4d. per beast. From the accounts of sales effected by farmers' associations and by private individuals that have recently come to hand, it would appear that the price obtained under the abattoir conditions has been from £2 to £2 10s. per head more than is obtainable for cattle sold on the hoof. The dead weight of these oxen was 637 lbs.

Some erroneous ideas seem to have spread among farmers as regards the disposal of the hide and offal of the animals that are slaughtered at the abattoir. It should be distinctly understood that, when cattle are sent to the abattoir for slaughter, the hide and all the offal—and it may be useful here to note that the term "offal" includes the head, heart, tail, liver, tongue, and tripe—belong to the sender of the cattle just as the meat itself does; and that, if they are not sold at the time the oxen are killed, the hides and offal are placed in cold storage to be sold at the same time as the meat.

Railway Rates on Grain & Wattle Bark.

OFFICIAL notification has been given in the *Government Gazette* of a rebate on South African grain conveyed between N.G.R. stations and the Point, for export oversea beyond South African ports. Such grain, when consigned to Point Station in lots of not less than 20 tons (short) will, subject to a minimum of 5s. per 2,000 lbs., be conveyed at one half-penny per ton per mile, at owner's risk. The ordinary South African produce rate will be charged in the first instance, and a rebate between such rate and one half-penny per 2,000 lbs. per mile will be granted on presentation of a certificate signed by the Collector of Customs that such consignments have actually been shipped to ports beyond South Africa. The ordinary South African produce rate and conditions will apply to consignments which do not, at that rate, exceed 5s. per 2,000 lbs. Full particulars will be furnished on application to stationmasters, goods agents, or to the office of the General Manager, Maritzburg. This new arrangement came into force on the 24th April.

It is also notified that, on and from Monday, 13th May, 1907, wattle bark, packed in bags, conveyed between N.G.R. stations will be charged as under:—1 to 58 miles, Tariff No. 7; above 58 miles, Tariff No. 6 (S.A.P.). Wattle bark in bundles will be charged at these rates, plus 10 per cent., and can be accepted only at owner's risk.

Wattle or any other wood intended for fuel will in future be carried over the Natal Government Railways at the coal rate.

East Coast Fever.

ISSUE OF DONKEYS AND MULES.

VRYHEID FARMERS' COMPLAINTS.

THE report of the Principal Veterinary Surgeon (Mr. Woollatt) for April contains an explanatory statement with regard to the complaints which have been raised by farmers in the Vryheid district in respect to the mules and donkeys issued to them by the Veterinary Department in connection with East Coast Fever. During the month much was said in certain sections of the daily press regarding these animals; and at the recent Conference of the Natal Agricultural Union the subject was also raised, when the facts concerning the matter were stated by the P.V. Surgeon himself.

The animals which have been issued in the Vryheid district may be classed under three heads:—

1. Spans of donkeys in charge of local committees to do transport work generally, and to do ploughing for individuals in turn—these animals being lent without charge and remaining the property of the Government.

2. A span of mules lent to the Babanango farmers free of charge, on condition that the people of Babanango fed the animals and supplied the driver, etc.

3. Animals issued to farmers on the extended payment system.

With regard to the donkeys referred to under the first heading, Mr. Beckett, who was the District Veterinary Surgeon at the time, on more than one occasion reported that these animals were not receiving proper treatment, being overworked and underfed. The animals specified under the second heading, too, were not properly fed, and were consequently withdrawn by the Veterinary Department. They were replaced by a span of mules fed by the Veterinary Department and in charge of a driver paid by the Department. A rate was fixed for transport, in order to meet the expense, but since this alteration has come into force, Mr. Woollatt reports that he has heard of no transport work being carried on. Mr. Woollatt's remarks at the Conference regarding animals not being properly treated, applied to these animals (the property of the Government), and did not apply to animals issued to farmers purchased under the extended payment system, as the latter animals became the property of the individuals when issued.

At the outset, Mr. Woollatt goes on to say, in his report, applicants from Vryheid asked for

UNIMMUNISED MULES.

As with all other susceptible animals, the mortality from horsesickness in the Vryheid district amongst mules issued has been high; yet, notwithstanding this, when it could be shown that an animal had died after having been received by the purchaser, within the incubation period of horsesickness—showing that it was infected when it left the charge of the Veterinary Department—such animal has been replaced free of cost. In one case twelve mules were supplied, of which two were dead in the truck from horsesickness when they arrived at Vryheid, and others died a few days later. These mules were forwarded in the usual way from the farm on which they were running, and were to all appearances healthy when trucked. All the mules that so died were replaced. "It is a common experience," Mr. Woollatt says, "for animals to be apparently healthy to-day and dead in a day or so of horsesickness"; and he points out that persons who buy animals on public sales, which may die a day or so afterwards, do not get them replaced, as has been done by the Government in the cases referred to.

With regard to

GLANDERS,

the P.V. Surgeon states that a number of mules which had been issued were some three or four months later involved in an outbreak of glanders in Vryheid town. All mules purchased by Government are tested with mallein prior to the purchase being completed; and any mule returned, whatever work it may have been employed on, is again tested. Mr. Woollatt states that the Veterinary Department has had no cases of glanders amongst their mules, and he is satisfied that no infected animal has been issued by his Department.

With reference to the

MORTALITY AMONG DONKEYS,

the total number of deaths in the Vryheid district which have been reported is 16, out of 150 animals which were issued. Eleven of these sixteen donkeys formed part of a lot of twenty-four head, whilst the remaining five belonged to another lot of twelve. These donkeys, it is understood, died from what is termed "necrosis of the coronets," a contagious disease affecting principally the lower joints of the limbs and most commonly starting in the heels. Any part of the body may be the seat of the lesions, and the disease is characterised by the tissues involved and the joints sloughing. This disease would appear to always exist in certain localities, but only shows itself under favourable circumstances, such as excessively wet weather. "We had no case of this disease amongst our donkeys prior to their being issued," Mr. Woollatt avers; "and at no time has a donkey, outside of Vryheid, been seen to suffer from this disease."

That the disease is not confined to animals issued by Government

is shown by the fact that Mr. Lello, of Nyalise, lost 11 head out of 30 and still has several sick. These donkeys had been in the district three years. Further, Messrs. Rose Bros. have lost 17 out of 26 donkeys purchased last November in Johannesburg; and Messrs. Scholz and Potgieter have lost 7 out of 24 which came from Johannesburg last January. Mr. Woollatt concludes: "Donkeys have been issued by us to other districts than Vryheid from the same lot of animals from which those sent to Vryheid were issued, and we have received no reports of deaths from this necrotic disease or complaints otherwise. We still have in Maritzburg donkeys on hand from the original lot from which the Vryheid donkeys were issued, and up to the time of writing (18th May) these animals are still healthy."

Tanning Material.

A root of what was said to be an indigenous tree, and which appears to be that of *Elephantorrhiza Burchelli* (Leguminosae) (Eland's-boontjes) was recently forwarded to the Chemical Branch of the Department of Agriculture from near Hillcrest for examination as to its tannin contents.

The fresh root contained:—

Moisture	70.66	per cent.
Ash	1.57	"
Soluble Solids	15.53	"
Non-Tannins	8.16	"
Tannins	7.37	"

This, when calculated to that of the air-dried state with 12.5 per cent. of moisture, in which condition it would most probably be considered commercially, represents:—

Total Soluble Extract	46.1	per cent.
Non-Tannins	24.5	"
Tannins	21.6	"

Wattle bark contains 35 to 38 per cent. of Tannins, so that the root is inferior in that respect, and the greater difficulty in growing and harvesting it would count against it as compared with the handling of wattle bark. The extract, according to an Imperial Institute Report, is, besides, not in favour with tanners, owing to the undesirable colour it gives to leather.

ALEX. PARDY,
Analyst.

The Todd Machine for Sisal Hemp.

It is stated, in *Agricultural News* (Barbados), that the Todd machine has given the best results in the Bahamas in extracting sisal hemp. In reply to an inquiry, Mr. W. H. Cunningham, Curator of the Botanic Station at Nassau, has furnished the Imperial Commissioner of Agriculture with the following useful information in regard to the amount of water necessary to extract a ton of fibre with this machine:—

“The Todd machine with which I made the test cleans, on the average, $\frac{1}{2}$ ton of fibre per day of eight hours; running at high speed, the same machine is capable of cleaning 1 ton per day of ten hours. Cleaning $\frac{1}{2}$ ton per day of eight hours, the machine uses 15 gallons of water per minute, or 900 gallons per hour—7,200 gallons for eight hours, for $\frac{1}{2}$ ton of fibre. Running at high speed, the machine would, I think, use 12,000 to 15,000 gallons of water for cleaning 1 ton of fibre. The engine used is a Crossley oil engine, 30-h.p. It uses 20 gallons of water per day of eight hours, to clean $\frac{1}{2}$ ton of fibre; the water used by the engine is principally for cooling the cylinders. I find this engine does splendid work. For prices and all information regarding it, please apply to Mr. F. W. Menendez, Nassau, Bahamas, who is, I believe, the agent for the West Indies.”

The total cost of an outfit to turn out about $\frac{1}{2}$ ton to $\frac{3}{4}$ ton of clean fibre per day, consisting of an engine, a single Todd machine, and a steam press, would be, it is stated, about £1,000.

Certificates for Export of Plants, etc.

IN accordance with the new South African Inter-Colonial plant import regulations, all consignments of plants, cuttings, etc.—nursery stock or otherwise—exported from Natal to Cape Colony, Orange River Colony, Transvaal, and Rhodesia, have to be accompanied by a special certificate, signed by the consigning nurseryman, that all the requirements of the Plant Import Regulations of the Colony to which such plants, etc., are being exported have been complied with. The certificate (printed forms of which are obtainable from the Department of Agriculture) is in two forms, the first for nursery stock (Form “A”) and the other (Form “B”) for other than nursery stock. No certificate is required with (a) vegetables or vegetable transplants, (b) cut flowers, (c) fruit, (d) seeds, and (e) plants or portions of plants not to be grown.

With the exception of nursery stock, which is subject to special restrictions, all other plants are subject to the following conditions and

must be accompanied by Form "B":—Ten plants or cuttings of any one variety is the limit that may be sent in a single consignment, unless special permission to send more has been obtained from the Department of Agriculture of the Colony to which the plants are going forward; ordinarily such special permission will be endorsed on the Form ("B"). Any fruit tree, fruit-bearing plant, rose plant, or any part thereof, for the Transvaal, Orange River Colony, or Rhodesia must, unless certified by the Government Entomologist of Natal to be apparently free of insect pests and plant disease, be sent in transit to any Inspector for the receiving Colony for the purpose of inspection and any required treatment. Inspectors for the Transvaal are located at Johannesburg and Pretoria; for the Orange River Colony, at Bloemfontein; and for Rhodesia, at Bulawayo, Salisbury, and Umtali.

Apple trees despatched from Natal to any other Colony must be on Northern Spy roots or other roots officially accepted as resistant to the attacks of Woolly Aphis in the Colony to which the trees are sent. Grape vines must be on roots resistant to the Phylloxera, and all cuttings of grape vines must be of resistant kinds.

All fruit trees, fruit-bearing plants, and portions thereof, have to be fumigated immediately prior to shipment with hydrocyanic acid gas. Society, Mr. P. F. Posthuma, The Hague. The Netherlands Consulate at of Natal.

The C.O.D. System.

AN ATTEMPT AT RESUSCITATION.

ONE of the root ideas of the principle of co-operation is that of the dethronement of the middleman in all transactions where it is possible to do without him, and it is to the following of that idea that the success which almost invariably attends the co-operative movement may be largely attributed. In the "Collect on Delivery" system, the same idea is evident; for the whole object of the scheme is to do without the middleman and his profits, and so bring the producer and consumer into closer touch with each other.

Towards the end of 1904—during Mr. Clayton's term of office as Minister of Agriculture—an attempt was made to introduce the C.O.D. system into Natal, for it was recognised that it was here, if anywhere, where such a scheme for the disposal of produce was wanted. The Railway Department entered into the spirit of the idea, and, in co-operation with the Department of Agriculture, sent hundreds of circulars all over the country explaining the scheme. Every effort was made to further the system, and everything was got into thorough working order, but, whether the scheme was not advertised sufficiently widely or whether producers and consumers both failed to realise altogether the

advantages of the system, what interest had been aroused waned, and the hopes of the Department were not realised.

Another effort is now being made to awaken general interest and to get the townspeople and the farmers to enter into communication with each other for the purpose of the disposal of the latter's produce. All that is necessary is to write to the Department of Agriculture, giving particulars of requirements, etc. The farmer has only to state what produce he has to offer, giving quantities and prices; and the consumer, in his turn, has only to say what produce he requires and in what quantities. The Department will then give each the names and addresses of persons likely to do the required business; and it only remains for the sender of stuff to consign his produce direct to his individual customers, who will pay the value of the goods, together with the cost of carriage, to the Railway Authorities immediately upon receipt. The Railway Department will then hand the value of the goods to the sender.

The townspeople are, it is certain, only too glad to get good, fresh farm produce direct from the producer, provided the way is made easy for them; and the farmer can thus rest tolerably well assured that, provided he gives the required amount of care in selecting and packing his stuff, he will soon get a circle of regular customers for what he can send.

Persons desiring detailed information regarding the C.O.D. system are invited to write to the Secretary, Minister of Agriculture, Pietermaritzburg, who will also place them in communication with producers or consumers, as the case may be.

Cotton and Sisal.

AN EXPERIMENT IN GERMAN EAST AFRICA.

IN *Der Pflanzler* for April 3rd, published at Amami, G.E. Africa, an account is given of an experiment recently carried out to ascertain the effect upon cotton of its cultivation between rows of aloes in sisal plantations.

The experiment was conducted in a plantation of some 138 acres of sisal, and the result is said to have been very successful. Two rows of Mitafifi cotton were planted between each row of the young sisal plants. The seed was sown in drills about 20 inches apart, and lightly covered over. Later on, the young plants were thinned out to two plants in each hole. It was found that the plants from seed that had been sown in drills from 4 to 6 inches deep did better in the dry season than those from seed which had been planted nearer the surface. The best crops were obtained from those sections which were sown towards the end of the rainy season, *i.e.*, in the months of April and May.

In October, after the cotton had been harvested several times, the cotton plants were cut down. They immediately sent out new shoots, and were soon thickly covered with blossoms, so that, before the heavy rainy season came on, it was possible to reap a second harvest.

The weeds that were dug up in the course of cleaning the ground between the cotton plants, the leaves that fell from the cotton plants during the harvesting, and the cotton plants themselves that were cut down, after the harvesting had been finished, partly consumed by the white ants, made a good humus for the following year.

The young plants did not suffer from the shade of the cotton plants: in fact, they did well, the cotton plants shading the ground between the rows of sisal and preventing the too rapid drying up of the ground.

The yield obtained in this experiment was 608 cwt. of raw cotton, equalling over 200 cwt. of clean cotton; and a cwt. of cotton per hectare (about 2½ acres) was obtainable, in addition, from the plants that had been cut down.

This system of cultivation, it is stated, involves very little extra cost: and, where the climatic and soil conditions are suitable for cotton, the results would appear to warrant it.

Correspondence.

COWPEAS.

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

SIR,—The following may be interesting to some of your readers:—In October last I found a single small blueish-grey cowpea amongst some garden seeds I got from America. This I stuck in the ground under a rose-bush at the side of a road, where it grew unnoticed and, in fact, almost forgotten, for some months, until happening to pass there one day I noticed the healthy condition of the plant, which was then just coming into bloom. I then merely protected the vines from being trodden upon by anyone passing along the road. In February the beans began to ripen, and towards the end of that month I collected from the one plant 453 well-matured and ripened pods containing from 9 to 19 seeds. I counted the seeds of sixty pods taken in a double handful from the lot and they averaged 14.2, thus giving a grand total of over 6,400 seeds. This, I think, is a record, at least for Natal.

I may add, since the plant was growing at the side of a road a portion of the vines ran into the grass, and from that portion I practically got but few beans, as most of the pods were eaten out either by insects or mice.—Yours, etc.,

Angekatale, Greytown.

THEO. MENNE,

Gardening Notes for June.

By W. J. BELL, Nurseryman, Florist and Seedsman, Maritzburg.

KITCHEN GARDEN.

WHERE water is obtainable further sowings may be made of Cabbage, Carrot, Beet, Radish, Turnip, Lettuce, Onion, Spinach, Parsley, and other herbs. Immediately the seeds are sown, cover the beds with some light litter. This will not only conserve the moisture but will protect the young seedlings to a great extent from severe frost, care being taken that all the watering required is done in the morning, and the earlier the better during frosty weather.

Most of the work in kitchen garden this month will consist in watering and keeping the surface well stirred between growing crops, especially those soils that become hard and impervious to air through frequent applications of water.

Where this is so, a good mulch of half decayed manure round the roots of Cauliflowers, Cabbages, etc., will conserve the moisture and prevent hardening of the surface after watering.

All ground to be left vacant during the winter should be dug over and left as rough as possible till spring to allow of frost penetrating it. This will destroy a lot of insect pests and bring the soil into a nice friable condition ready for spring sowing and planting.

Mulch Strawberry beds with a layer of old decayed manure. Fresh manure must not be used, as it will do more harm than good.

Cauliflowers, Cabbages, Peas, Celery, and other crops maturing now will be greatly benefited by occasional applications of liquid manure.

FLOWER GARDEN.

Where the frost is not very severe the following flower seeds may be sown this month:—

Antirrhinum, Aquilegia, Candytuft, Calendula, Alyssum, Cyanus, Coreopsis, Gaillardia, Larkspur, Dianthus, Eschscholtzia, Godetia, Phlox Drummondii, Petunia, Poppy, Scabious, Sweet Sultan, Salpiglossis, Nigella, Sweet William, and Pansy.

Sow in boxes Carnation, Pentstemon, Daisy, Cowslip, Primrose, Polyanthus, Hunnemannia (Mexican Poppy), Forget-me-not, Hollyhock, Pyrethrum (Golden Feather), Stock (10 Weeks and Brompton), and Verbena.

A nice light sandy soil should be used, and the boxes must be placed where they will be effectually sheltered from hot winds and afternoon sun, such as the south side of a wall or building.

When the young seedlings are strong enough to be transplanted, they may be pricked out into other boxes or into a well-prepared bed in a

sheltered part of the garden a few inches apart, where they may grow on till large enough to be finally planted out for flowering. A dull day should be taken advantage of for this work, and the seedlings must be carefully watered and shaded for some days.

Towards the end of the month the pruning of deciduous flowering shrubs, fruit trees and vines may be commenced and cuttings may be put in.

At this time and during the month of July all kinds of deciduous fruit trees should be planted, such as Apples, Pears, Apricots, Peaches, Plums, Nectarines, Mulberries, Quinces, Medlars, Pomegranates, Figs, Walnuts, Spanish Chestnuts, Filberts, Grape Vines, etc.

District Reports.

IXOPO, 7th May.—During the last month there were several wet days, and the rain has done considerable good. The grass looks greener now than it usually does about the month of February. Snow fell on the Berg on the 25th ultimo and also this week, but up to the present frosts have been very mild. The mealie crop promises to be better than usual, and if the locusts had not visited the district it would certainly have been a record crop. There are still numerous locusts in the Lufafa Location. A large number of horses have died from horsesickness, mostly belonging to natives, which horses are not stabled but allowed to graze during the night on low swampy ground. Up to date the following taxes have been paid, viz., Hut Tax, £7,424 4s.; Poll Tax, £2,324; Dog Tax, £492 15s.; Indian licenses, £21; total, £10,250 19s. So far £200 more Hut Tax has been paid than last year, but the Poll Tax shows a deficiency of £1,603. This is accounted for by the fact that there were more Europeans in the Division last year. Many natives are away looking for money, and numbers of boys have married to save 6s., being the difference in the tax on a hut and on a poll. This, I think, shows the advisability of increasing the Hut Tax to £1, otherwise these early marriages will cause an enormous increase in the native population and the native race will deteriorate. Many Europeans are having native tenants ejected as soon as the latter have reaped owing to the natives refusing to work satisfactorily or because the Europeans require the land for farming purposes. The difficulty will be to find ground for these ejected natives. A certain number might be allowed to remove into the locations; if better use could be made of the locations by allowing no kraals of less than 10 huts and to compel the natives to keep their cultivation separate from the grazing ground so as to make more use of the land. Other kraals could be removed to Zululand, where only large

kraals should be permitted, with the object of gradually removing all natives from Natal who are not working. If an Act were passed prohibiting landlords from charging rents, the surplus native population would have to leave and Natal would become a white man's country. I am pleased to state that many farmers are ploughing large areas for the purpose of planting wattles. This is being done on account of the construction of the railway from Umzinto to Donnybrook.

FRANK E. FOXON, Magistrate.

MELMOTH, 16th April.—The district is, I am glad to say, still free from East Coast Fever, and long may it remain so. The Eshowe-Ginginhlovu road was closed to us shortly after the rebellion, and we have had to make Empangeni, in the Lower Umfolozi Division, our rail head. This increases the cost of goods by about 10s. per ton—a consideration in these hard times. The transport rates are about the same as to Ginginhlovu, but the road is very much worse, especially in the Lower Umfolozi District. Zebra and other game are overrunning the Nseleni District of this Division, and the natives' cattle are dying in consequence from *magana* or tsetse fly. It is feared that the road to Empangeni will become affected, and an effort is shortly to be made to drive the game back into the game reserve: once disturbed, it is hoped they will keep to the protected area. Locusts have been bad, but, owing to the wet weather we have been experiencing lately, they have disappeared, but not before having done great damage. It will be welcome news to the whole Colony to hear that they are dying in large numbers—in fact, swarms—all over the country from the effects of a maggot which attacks them under the "saddle" or shell immediately behind the head. Should they continue dying at the present rate we are in hopes that the locust plague will soon be a thing of the past. Owing to the ravages of the locusts, it is feared that grain will be high in price again this season. I say "feared" advisedly, as I do not think the farmers will have enough for their home consumption, and they, as well as the natives, will have to buy. The black-and-yellow beetle, known to the Dutch as "*Tor*," has been very bad this season, destroying everything put in for a winter garden; and vegetables will be very scarce this season. We will have to fall back on the inevitable rice and dry beans, varied occasionally with beans and rice. Prospecting for tin is going on briskly in the Division, and several large areas have been pegged off, one of which, I understand, has been taken up by a Durban syndicate. The "Bob Watkins" gold property has been taken over by Mr. John Muller, lately of Nongoma, who has purchased and is erecting a battery on the property; and he feels confident of success. I feel sure that with careful prospecting by the right sort of men gold in payable quantities will be found here.

A. J. MARITZ, Magistrate.

Animal Diseases.

THE POSITION IN APRIL.

East Coast Fever.—The Principal Veterinary Surgeon (Mr. Woollatt) reports that, during April, there were 11 fresh outbreaks of this disease:—Umvoti 1, Dundee and Umsinga 4, Paulpietersburg 5, and Nkandhla 1. The following deaths occurred:—Lower Tugela and Mapumulo 791, Umzinto 8, Durban County 159, Mudea 31, Dundee, Umsinga, Nqutu and Nkandhla 388, Eshowe 1, Paulpietersburg 89, Mahlabatini 107, Nongoma 788, Hlabisa 210, Vryheid and Ngotshe 520, making a total of 3,098 deaths during the month. The disease continued to spread within the Magisterial Divisions of Lower Tugela and Mapumulo. In the Vryheid and Ngotshe districts five fresh centres were created; and in the Nongoma and Hlabisa districts of Zululand the disease has also crept along. The branding of cattle within the infected areas outside the infected areas in Zululand is being proceeded with. The native guards have been removed from the several infected areas within the Nongoma and Hlabisa districts of Zululand; and natives have been allowed to take their cattle back to their infected kraals to die there instead of dying at remote spots. It is felt that no good is being done with the native guards endeavouring to confine the disease within these infected centres, owing to the wide distribution of infected veld and the great difficulty experienced in preventing cattle "overlapping" in their grazing. More energetic measures are being taken. Mr. Woollatt reports, in preventing these districts acting as a source of infection to the Mahlabatini and other districts. In the Mahlabatini district the position is reported to be much more satisfactory and hopeful. Zones free of cattle have been formed around all the infected centres by removing the cattle by means of temperature camps. The outbreak at Nkandhla, it is stated, was due to cattle being moved from Nqutu district before infection was known to exist in the latter district. This outbreak has, however, occurred amongst an isolated lot of cattle. The cattle have been quarantined since their return from Nqutu, and, as other cattle in this vicinity were removed during the Native Rebellion, there is, Mr. Woollatt thinks, some hope of being able to confine the outbreak to this one centre. In the Nqutu district the disease is continuing to spread from the infected centres. As regards the Dundee district, D.V. Surgeon Bruce reports that the disease in the Dundee and Umsinga area is still in hand, all the infected and in-contact cattle having been placed in temperature camps; although, with the number of cattle that exist around the infected centres and the limited area of clean veld at the disposal of the Department, Mr. Woollatt has little doubt but that further outbreaks must occur. If so, as the removal of cattle through

temperature camps will be practically impossible, he is of opinion that the mortality will in consequence be excessive. In the past the death-rate has been low, solely due to its being possible to pass the cattle through temperature camps.

Lungsickness.—No fresh outbreaks of this disease occurred during April. There are eleven troops of cattle still under license in the Krantz-kop and Umvoti districts, and during the month there were 22 deaths, principally from inoculation. With the strict quarantine which is being maintained on these cattle, and which will be maintained for a sufficient time to cover the incubation period of the disease, it is hoped that no further extension will take place. It is absolutely essential, Mr. Woollatt considers, that the quarantine of these cattle should be maintained for at least three months, or the efforts which are being made to check the spread of the disease will not be successful and a considerable mortality amongst the cattle concerned in these outbreaks will ensue.

Horsesickness.—Over a thousand horses died from this disease, the greatest number of deaths taking place in the districts of Impendhle (reported as "very heavy"), Ixopo (250), Weenen (120), Dundee, Nqutu and Nkandhla (139), Lion's River (90), Underberg (85), Polela (78), and Umvoti (50). In the course of his report to the Principal Veterinary Surgeon, D.V.S. Verney (Mooi River) remarks: "Several horses housed in good stables have succumbed, but I have heard of no losses where the stable was properly smoked. The Imperial Remount Depot have done their utmost to prevent horsesickness, waging war against the mosquito by means of lime, paraffin, and smoke. Out of 256 horses, one horse has succumbed. This horse was suffering from loss of hair and was isolated in an open shed in the lowest part of the Remount Depot. I feel sure had not these precautions been carried out, there would have been a heavy mortality."

Sheep Scab.—Twelve licenses were raised during April:—Klip River 1, Estcourt 2, Weenen 1, Krantz-kop 1, Ixopo 1, Vryheid 3, Ngotshe 3. Ten flocks were placed under license:—Klip River 1, Estcourt 1, Umvoti 1, City and Umgeni 2, Lion's River 3, Utrecht 1, Zululand 1. There are 48 flocks still under license.

Glanders.—During the month three animals showing clinical symptoms of the disease were destroyed and seven which reacted to mallein. These outbreaks occurred in the Newcastle, Vryheid, Dundee, Umvoti, and Pietermaritzburg districts.

"Stiffsickness."—This disease was very prevalent during April in the Dundee, Greytown, and Newcastle districts. In the Dundee district very few deaths took place, whilst in the Greytown district no deaths at all were reported. In the Newcastle district eight deaths were reported. The District Veterinary Surgeon for Newcastle (Mr. Hutchinson) states, in his report to the P.V. Surgeon, that some animals appear to take the disease a second time, and that reports have frequently been

received as to horses having been attacked by a similar disease. Up to the present, however, Mr. Hutchinson has not met with any of these cases.

Quarter-evil.—Six deaths from this disease occurred in the Dundee district.

Blue-tongue in Sheep.—In the Newcastle district 170 deaths were reported.

Redwater.—This disease has been prevalent in the Mooi River district. "Some of these outbreaks," the District Veterinary Surgeon for that district (Mr. F. A. Verney) remarks, "have been distinctly traceable to bringing low-veld cattle on to high-veld farms; and I certainly think owners of valuable cattle should always be very careful in doing this, and in any case should always see that such cattle are properly dipped immediately before being put on thin veld."

Importation of Stock by Sea.—D.V.S. Amos reports that 2 horses, 17 sheep, and 25 dogs were imported into Natal by sea during April.

A POISONOUS WEED.—Mr. J. F. E. Barnes, the Chief Engineer, Public Works Department, has drawn the attention of the Minister of Agriculture to a weed that is reported to be spreading so rapidly in the Insinga Valley, in the Hinneville district, that in some instances it has almost completely killed the veld grass. The blossom is very like that of the "canary" weed. The weed grows in thick stoles with hundreds of blossoms, each blossom bearing some thirty to forty fluffy seeds which, scattered broadcast by the wind, spread rapidly. Where it takes hold of the land the weed appears to be difficult to exterminate. It is reported to be widely spread in East Griqualand also, though it is believed by people there that the weed will die out, of itself, after three or four years. Mr. J. Medley Wood, Director of the Natal Botanic Gardens, Durban, to whom specimens were submitted, has identified the weed as *Senecio Burchellii*, D.C., an indigenous plant which he has several times seen in the midland districts. He states that it is poisonous to stock. Mr. Barnes has called the attention of the Road Superintendent to the weed, and has given instructions that within road boundaries wherever seen it is to be destroyed. The Department of Agriculture would be glad to have reports from farmers who may happen to have noticed the weed in question in their district, with a view to ascertaining to what extent and in what districts the plant is spreading. Any reports as to the extent of damage—if any—done by the weed would also be valued. Should the plant appear likely to become troublesome, special measures will probably have to be taken to arrest its spread and eradicate it entirely.

Meteorological Returns.

Meteorological Observations taken at Government Stations for Month of April, 1907.

STATIONS.	TEMPERATURE (IN FAHR. DEGS.).				RAINFALL (IN INCHES).						
	Means for Month.		Maximum for Month.	Minimum for Month.	Total for Month.	No. of Days.	Heav'est rain-fall in 1 day.		Total for Year from July 1st, 1906.	Total for sameper'iod from July 1st, 1905.	
	Maximum.	Minimum.					Fall.	Day.			
Observatory ..	77.4	62.2	84.2	57.6	9.39	19	3.70	7th	40.30	35.97	
Stanger ..	79.0	61.6	88	58	3.42	14	1.14	2nd	37.15	35.15	
Verulam ..	82.5	61.6	89	54	9.11	8	4.06	6th	40.77	27.66	
Greytown ..	72.5	47.2	84	39	4.38	14	.84	15th	35.90	24.51	
Newcastle ..	71.9	51.0	83	42	4.21	15	1.12	24th	58.45	29.37	
Ndwedwe ..	70.3	59.9	78	53	4.36	14	1.25	3rd	39.01	36.14	
Estcourt ..	74.0	48.5	85	41	2.15	7	.60	6th	30.86	24.72	
Mid-Illovo ..	73.7	65.0	85	47	5.95	17	1.37	1st	42.69	27.98	
Port-Shepstone..	73.2	58.8	88	53	7.63	8	2.20	7th	—	—	
Umzinto ..	77.6	65.9	82	60	4.88	6	2.15	14th	45.56	35.28	
Richmond ..	73.1	51.1	84	42	0.89	12	1.88	1st	50.88	32.06	
Maritzburg ..	74.5	51.9	85	41	5.25	11	1.10	7th	52.13	25.34	
Howick ..	72.2	43.2	87	41	4.68	11	1.50	17th	42.68	23.66	
Ladysmith ..	78.1	50.9	91	41	2.63	11	.70	25th	—	—	
Dundee ..	67.5	52.7	79	40	4.54	12	.75	1st	37.06	27.8	
Weenen (Gool) ..	80.6	51.6	89	41	2.91	13	.63	17th	30.47	22.01	
Impendhle ..	64.4	45.9	74	39	5.06	15	1.10	7th	46.13	—	
New Hanover ..	72.4	5.7	83	45	3.70	14	.75	17th	54.10	26.21	
Charlestown ..	65.7	45.6	78	32	3.8	16	1.15	6th	63.60	—	
Nqutu ..	71.8	51.6	82	45	5.00	12	1.76	6th	—	19.94	
Nongoma ..	72.1	46.3	89	40	8.51	11	3.0	7th	47.95	30.85	
N'Kandhl ..	76.5	46.7	87	37	4.81	11	1.28	7th	33.87	24.69	
Umlalazi ..	78.7	48.1	86	35	7.96	11	1.65	5th	—	33.85	
Hlabisa ..	74.4	58.9	88	50	6.49	11	1.72	9th	44.41	26.22	
Melmoth ..	72.9	56.2	87	50	3.60	17	.59	3rd	37.25	22.91	
Ubombo ..	74.2	58.1	88	53	6.15	16	2.06	3rd	48.87	—	
Eshowe ..	72.7	53.3	84.1	51.9	5.42	10	1.13	3rd	—	—	
Point ..	—	—	—	—	9.23	9	3.65	6th	41.63	35.61	
Amatikulu ..	78.3	59.5	91	54	3.12	12	.76	2nd	26.99	—	
Vryheid ..	72.3	50.3	85	42	3.31	14	.91	7th	36.40	—	
Eupangeni ..	—	—	—	—	5.83	13	1.50	3rd	33.24	—	
Bulwer ..	—	—	—	—	5.91	14	1.29	1st	—	—	
Maritzburg (Burger Street)	—	—	—	—	5.38	—	1.33	8th	60.73	—	

Meteorological Observations taken at Private Stations for Month of April, 1907.

STATIONS.	TEMPERATURE (in Fahr. Degrees)		RAINFALL (in inches).						
	Maximum for Month.	Minimum for Month.	Total for Month.	No. of days.	Heaviest Rain- fall in one day.		Total for Year from July 1st, 1906.	Total for same period from July, 1905.	
					Fall.	Day.			
Esperanza (Beneva)	5.82	8	2.07	13th	47.40	..	
Brankholme (Charles Scott)	6.02	11	1.10	4th	61.09	38.16	
Nottingham Road (C. J. King)	3.58	11	0.75	13th	49.26	35.74	
Adamshurst (Wm. Adams)	35	4.61	10	1.14	17th	36.50	23.07	
Hilton College (W. Engel)	60	4.36	11	1.43	17th	47.41	26.07	
P.M.B., Town Bush Valley	5.85	11	1.76	17th	57.51	34.89	
Dulton	2.38	14	0.48	1st	37.9	..	
Ottawa (G. Wilkinson)	10.23	12	4.90	7th	32.20	..	
Mount Edgcombe	93	10.70	15	5.12	7th	47.73	31.32	
Equeefa (W. Hawksworth)	39	6.30	10	2.13	14th	50.14	33.98	
Winkel Spruit	82	7.20	9	2.41	13th	43.38	37.78	

Coal and Labour Return.

Return of Coal raised and Labour employed at the Natal Collieries for the month of April, 1907 :—

Name of Colliery.	Labour Employed.									Output.
	Above Ground.			Below Ground.			Unproductive Work.*			Tons. Cwt.
	E.	N.	I.	E.	N.	I.	E.	N.	I.	
Natal Navigation	32	81	279	18	292	183	—	—	—	21,095 12
Elandsburg	14	20	259	15	184	450	7	14	12	14,618 9
Dundee Coal Co.	16	12	159	8	51	362	1	—	42	11,426 9
Durban Navigation ..	19	108	11	7	245	40	—	13	—	9,367 0
St. George's	16	98	152	11	176	100	—	12	—	8,564 0
South African	8	40	47	7	205	27	5	22	30	8,558 13
Natal Cambrian	12	34	135	11	265	65	2	9	—	8,25 2
Glencoe, Natal	13	99	107	11	496	7	—	—	—	8,012 5
Newcastle	7	40	29	6	98	2	1	2	—	5,124 10
Natal Steam Coal Co. .	1	46	3	2	190	2	—	1	4	3,249 7
Ramsay	2	20	52	4	120	90	3	8	19	3,065 9
Central	—	50	9	4	150	5	2	39	—	2,523 2
West Lennoxton	5	2	60	2	21	95	—	—	—	2,387 2
Zululand	4	44	—	1	47	—	1	—	—	1,161 1
Talana (Natal)	3	6	8	2	59	25	2	21	20	690 12
Woodlands	2	4	4	1	7	3	—	—	—	70 0
Signal Hill	—	—	—	—	—	—	1	3	—	32 0
Vandbank	—	—	—	1	4	—	1	4	—	6 10
Dumbi Mountain† ..	1	1	—	—	—	—	—	—	—	3 0
Totals	158	705	1,365	111	2,084	1,456	26	148	118	108,980 12
Corresponding month, '06	114	725	1,126	126	2,639	1,443	51	365	150	98,626 2

* Cost charged to Capital Account.

† March Return.

Maritzburg,
7th May, 1907.

CHAS. J. GRAY,
Commissioner of Mines.

Return of Coal bunkered and exported from the Port of Durban for the month of April, 1907 :—

	Tons.	Cwt.
Coal Bunkered*	47,116	16
Exported to :—		
East London ..	104	8
Algoa Bay ..	951	18
Cape Town ..	15,464	18
Madagascar ..	2,062	2
Total ..	65,700	2

* Includes Foreign Warships.

Custom House, Port Natal,
1st May, 1907.

(Signed) GEO. MAYSTON,
Collector of Customs.

Return of Farms at Present under Licence for Lungsickness and Scab.

STOCK INSPECTOR.	DISTRICT.	DISEASE.	OWNER.	FARM.
A. P. Craw ..	Ladysmith ..	Scab	A. W. Illing ..	Minitans
J. R. Cooper ..	Nkandhla & Nqutu	Lungsickness	Mzambi ..	Rossboom
S. A. Brown ..	Underberg ..	Scab	L. Makoba ..	Middle Drift
			M. Butelezi ..	Jojosini
			J. A. Stone ..	
			T. de C. Arbuckle ..	Kerridge
			B. Phipson ..	Strathcampbell
			M. Fraser ..	Winterhoek
			R. C. Gold ..	Woo end
			J. R. Royston ..	Greenend
			J. van Whye ..	Silburn
A. B. Koe ..	Portion of Estcourt		F. A. Hathorn ..	Sauviana
			H. J. Hattig ..	Servitude
			A. H. Bennett ..	Winterton
			R. P. Summerrgill ..	York Grange
A. J. Marshall ..	Dundee ..		T. Wood ..	British Empire
			R. J. du Bois ..	Giba
			J. W. de Bruyn ..	Rooifontein
			C. M. Vermaak ..	Paddock
			L. W. Meyer ..	Langverwacht
			A. L. Jansen ..	Strathearn
			J. O. Nel ..	Earncliffe
			A. C. Vermaak ..	Sigtuna
			T. C. Vermaak ..	Harriotsdale
			H. Vermaak ..	Paddock
E. Varty ..	Western Umvoti ..		W. J. Slatter ..	Helm Lacy
			H. Hansmeyer ..	On Rust
			P. H. van Rooyen, senr.	Good Hope
J. J. Hodson ..	Ptn of Lion's River		G. H. Burgmann ..	Bosel Hoek
			W. A. Dales ..	Gowrie
			N. McKellar ..	Glenafon
			R. Spiers ..	Moyeni
			W. Willson ..	Thornton House
R. Mayne ..	Krantzkop ..	Lungsickness	P. B. Nell ..	Broeder's Hoek
			Maqamganse ..	Loots Hoek
			Uqupu ..	Myoniezwe's Locat'n
			Ndabane ..	
			S. Johnson & Co. ..	Inadie Store
			Ndabane ..	Myoniezwe's Locat'n
			Natives ..	Spitzkop
				Myoniezwe's Locat'n
		Scab	J. S. van Rooyen ..	Spring Grove
A. H. Ball ..	Weenen ..		P. J. Nel ..	Ungegund
			L. J. & T. C. Lotter ..	Waterfall
			I. J. Meyer ..	Victoria
G. Daniell ..	Vryheid ..		G. J. v d Westhuzen ..	Winterhoek
			J. E. Greig ..	Mansfield
			J. Wiggett ..	Bloemhof
			D. Coetzee ..	Schaapkopje
			R. L. Davies ..	Kambuldraai
R. Mayne ..	Eastern Umvoti ..	Lungsickness	Nkanyeze ..	Moolplaats
			C. van Rooyen ..	Boschontein
			D. A. Nel ..	Glen Boig
			Nkabi and others	Loots Hoek
J. Button ..	Portion of Estcourt	Scab	P. R. Botha ..	Olivefontein
			J. Bird ..	Mool River T'n Lds.
			J. Phipps ..	Littlecote
			Johnstone & Clark ..	Bergnian
E. Parkinson ..	New Hanover ..		J. H. Smith ..	The Grove
A. Hair ..	City and Umgeni ..		Ndabeni and Jim ..	Location
			Umbabana ..	Zwaartkop Location
D. M. Pfaff ..	Utrecht ..		E. Taylor ..	Zwaartkop Location
			G. S. Dicks ..	Groot Vlei

MANGE IN HORSES EXISTS AS UNDER.

Name.	District.	Name.	District.
W. E. Oates	Bergville	Nseleni	Underberg.
Mboyea	Bergville.	A. G. Stafford. .	Harding

Market Reports.

(Responsibility for the accuracy of the Statements and Opinions of the following Reports rests with the respective Contributors.)

PIETERMARITZBURG.—The Market-Master has furnished the following average prices realised on the Maritzburg Market during the month ended 15th May :—

Live Stock.—Fowls, 1s 9d ; ducks, 2s ; turkeys, cocks 10s, hens 5s 6d ; rabbits, 1s.

Animal Produce.—Bacon, 9d per lb ; eggs, 2s 3d per dozen ; ham, 10d per lb ; lard, 8d per lb ; pork, 6d per lb ; beef, 3½d per lb ; mutton, 6d per lb ; butter, 1s 6d per lb ; cheese, 8d per lb ; honey, 6d per lb.

Vegetable Produce.—Buckwheat, 7s 6d per 100 lbs ; earth nuts, 8s per muid ; barley, £4 per ton ; oats, £3 per ton ; hay, 25s per ton ; amabela, 10s per muid ; geba, 7s per muid ; lucerne, £4 per ton ; mealies, 10s per muid ; potatoes, 5s per 100 lbs ; peas, 12s per 100 lbs ; onions, 12s per 100 lbs ; sunflower seeds, 6s per 100 lbs ; sweet potatoes, 3s 6d per 100 lbs ; apples, 8s per 100 ; pears, 3s 6d per dozen ; bananas, 1s per 100 ; oranges, 2s per 100 ; naartjes, 2s 6d per 100 ; lemons, 1s per 100 ; pineapples, 1s 3d per dozen ; avocado pears, 2s per 100.

DURBAN.—Under date 10th May, the Market Master, Durban, reports the following average prices realised on the Durban market during the month of April-May :—

Live Stock and Animal Produce.—Fowls, 1s 8d ; ducks, 2s 3d ; rabbits, 10d ; eggs, 2s 3d per dozen ; butter, 1s 3d per lb.

Vegetable Produce.—Beans, 13s per muid ; earth nuts, 7s 6d per muid ; apples, 9d per dozen ; pears, 1s per dozen ; bananas, 6d per hundred ; kafir corn, 11s per muid ; mealies, 8s 6d per muid ; potatoes, 7s 6d per muid ; sweet potatoes, 2s 3d per muid ; turnips, £3 5s per ton.

JOHANNESBURG.—Writing under date of 10th May, Mr. Alfred Webb (P.O. Box 2342) reports the following prices realised on the Johannesburg Market during the preceding week :—

Live Stock.—Boar goats, 15s to 21s ; cows (milk), £15 to £40 ; donkeys, £6 to £8 10s ; mules, £15 to £22 10s ; oxen (slaughter), £10 10s to £12 10s ; oxen (dressed), 34s to 35s per 100 lbs ; pigs (live weight), 3½d to 4½d per lb ; sheep (slaughter lambs), 17s 6d to 22s 6d ; sheep (dressed), 5½d to 5½d per lb ; ducks, 2s to 3s 6d ; fowls, 1s 6d to 3s ; turkeys (cocks), 7s to 15s ; (hens), 3s to 7s.

Animal Produce.—Eggs (new laid), 2s to 4s, fresh 1s 6d to 3s per dozen ; butter 9d to 1s 3d per lb.

Vegetable Produce.—Bananas, 1s 3d to 3s 6d per 100 ; pineapples, 1s 2d to 1s 9d per dozen ; naartjes, 4s to 9s per 100 ; oranges, 3s to 6s per 100 ; bran, 8s 6d to 8s 9d per 100 lbs ; chaff, 4s 6d to 5s 3d per 100 lbs ; Kafir corn, 10s 6d to 13s 3d per bag of 200 lbs net ; lucerne : green 2s 6d to 14s 6d per 100 bundles, dry 6s 3d to 6s 9d per 100 lbs ; mealies : white 8s 9d to 12s 6d, yellow 9s 3d to 12s 3d, mixed 9s 6d to 12s 3d

per bag of 200 lbs net; mealie-meal, 13s 6d per bag of 180 lbs net; onions, 3s 9d to 10s 3d per bag of 120 lbs net; oats, seed, 8s 6d to 13s 3d per bag of 130 lbs net; peas, dry, 21s to 32s 6d per bag of 200 lbs net; pot. toes 10s to 18s per bag of 160 lbs net, medium 5s 9d to 13s 9d; sweet potatoes, 2s 6d to 8s 6d per bag of 120 lbs net; sunflower seed, 6s 3d to 7s per 100 lbs.

Mr. Webb adds that the potato section was well supplied, and growers should be careful of consigning anything but those in the very best condition. Finest locally grown went as high as 18s per bag, but the average price obtained for the same varieties coming from the country was 13s. He also states that a brisk demand exists for first quality sugar beans, and that as much as 44s to 47s per bag was obtained. Mixed varieties averaged out at 30s per bag.

Pound Notices.

NOTIFICATION is made in the *Government Gazette* relative to the sale, on the dates indicated below, unless previously released, of the impounded stock specified hereunder:—

On the 5th June:—

Ladysmith.—(1) Black Africander sheep, hamel, white patch on both sides, ears docked off. (2) Black Africander sheep hamel, ears docked off. (3) Black Africander sheep, hamel, swallow tail in end of each ear. (4) Red Africander sheep, hamel, white patch on both sides.

Umsinga.—(1) Three Kafir goats and one Kafir sheep, no brands or marks. (2) Two Kafir goats, colour red, no brands.

On the 19th June:

Bulwer.—Black heifer, about 18 months old, two small white spots left side of head, small white patch right side close to ear, little white front of chest. Impounded by Unkinun, a Native, on the 22nd April.

Finchley (Ixopo Division).—Black hog pig, about 4 months old, four white feet, stump tail.

Melmoth.—(1) Twenty-six mixed Kafir goats. (2) Sheep, ewe, branded D.W. These animals were impounded by Mr. A. L. Pretorius, Waterval, on 30th April.

Polela.—Bay filly, age about 3 years, long mane and tail, no brands or marks, Running on the farm "Sterling," and reported by Mr. Wilson as too wild to be driven to the "Good Luck" Pound.

Serpentine (Newcastle Division).—Three Merino ewes: one aged, ear-marked right and left, swallow tail, half-moon at back of each ear; second, swallow tail right and left ear; third, slit in left ear, square out of back of right ear, dot out of front, no brands.

Stanger.—(1) Donkey, no brand. (2) Black she-goat.

Woodstock (Bergville Division).—Bruish black and white cow, branded P in diamond on left hip.

The pound established at Regina Farm, Umtwalumi, Alexandra Division has been abolished, and a pound has been established on the farm Umsikazi, Alexandra Division, under the supervision of Mr. L. Rigg as the keeper thereof.

Model Rules for Agricultural Co-Operative Societies.

THE Department of Agriculture has for disposal, at the rate of one shilling each, copies of Model Rules for the use of Agricultural Co-operative Societies. Applications should be made to the Secretary, Minister of Agriculture, Pietermaritzburg.

East Coast Fever.

SLAUGHTER CATTLE.

THE Department of Agriculture has erected abattoirs adjoining the Government Cold Stores, Maritzburg, where people will be able to forward cattle from clean and infected areas for slaughter. Killing, chilling, and freezing can be undertaken by the Department if desired, and arrangements can also be made for the forwarding by rail of meat intended for sale in markets outside Maritzburg. This will enable farmers, who wish to dispose of their stock for slaughter and find a difficulty in so doing, to have their animals killed in Maritzburg and the meat forwarded to Durban or any other market. The abattoirs will be under the personal supervision of Mr. A. R. Burford, the Manager of the Government Cold Stores, who is thoroughly experienced in this particular class of work.

The provisional abattoir charges are :—

Cattle per head	...	...	1s., with a minimum of £3 per killing space per month.
Sheep	...	...	1½d. each.
Pigs	...	...	3d. "
Chilling and Freezing Beef,	1st week	...	1s. 3d. per qr.
"	2nd "	...	1s. "
"	Remaining weeks	...	9d. "
Sheep	...	...	per week ... 3d.
Pigs	...	...	" ... 6d.

Charges for killing and handling Cattle, and placing same in Cold Storage, if required, or meat to be taken away by customer from hanging-room :—

Cattle, per head	...	...	4s. each (including abattoir fee).
Sheep	...	...	6d. "
Pigs	...	...	1s. .. up to 200 lbs.
"	...	...	1s. 6d. each, over 200 lbs. & up to 300 lbs.
"	...	...	2s. .. over 300 lbs.

Department of Agriculture, Maritzburg,
9th April 1907.

W. A. DEANE,
Minister of Agriculture.

Central Experiment Farm, Cedara.

IN order to minimise interference with the general course of work on the Central Experiment Farm, Cedara, it has been found necessary to set apart one day of the week, namely, Friday, as a visitors' day.

Arrangements will accordingly be made on that day for receiving visitors and showing them round the Farm. A trap will be at Cedara Station to meet the up 9.50 a.m. train; and if intending visitors from up-country will give notice to the guard at Howick Station, on their way down, a trap will be sent to meet the train which passes through Cedara at 11.2 a.m. Visitors travelling by other trains will also be met if they will previously make arrangements by writing.

On other than the visitors' day, visitors may be received by appointment, but special attention cannot be guaranteed in regard to their being shown round.

At least clear fourteen days' notice must be given by Associations, so that there may be time to make all necessary arrangements.

9th April, 1907.

W. A. DEANE,
Minister of Agriculture,

Executives of Farmers' Associations.

ALFRED COUNTY FARMERS' ASSOCIATION.—President: A. G. Prentice, J.P. Vice-Presidents: C. Knox, J.P., L. T. Trenor. Committee: C. M. Etheridge, E. J. Gray, W. R. Rethman, H. W. F. Rethman, O. A. Howell, R. E. H. Fann, J.P., W. T. J. Gold, Dr. Case, Revd. S. Aitchison. Hon. Treasurer: H. C. Hitchins. Secretary: T. Tribe.

BOSTON FARMERS' ASSOCIATION.—President: Thomas Fleming. Vice-President: J. Geldert. Hon. Secretary and Treasurer, W. J. Fly.

CAMPERDOWN AGRICULTURAL SOCIETY.—President: John Moon, C.O.; Vice-Presidents: A. N. Kirkman, J.P., and G. Swales; Hon. Secretary: — Wilson.

CAMPERDOWN AND DISTRICT FARMERS' ASSOCIATION.—President: John Moon. Vice-President: F. N. Meyer. Hon. Sec.: L. Baker.

DUNDEE AGRICULTURAL SOCIETY.—President: F. Turton, Esq., J.P. Vice-Presidents: The Minister of Agriculture, the Mayor of Dundee, Messrs. A. L. Jansen, H. Ryley, and W. Craighead Smith, J.P. Hon. Secretary and Treasurer: J. McKenzie. Committee: D. C. Pieters, D. Macphail, W. H. Tatham, H. Baasch, M. Taylor, J. A. Landman, N. F. Hesom, A. W. Smallie, C. W. W. ysall, W. Craig, C. G. Willson, T. P. Smith, J. Campbell, J. B. Duboissee, W. R. Queded, A. Grice, D. Meumann, W. J. H. Muller, J. E. Caldwell, E. C. Saville, C. M. Meyer, A. J. Oldacre.

DURBAN COUNTY FARMERS' ASSOCIATION.—Patron: J. H. Colenbrander. President: J. McIntosh. Vice-Presidents: H. Westermeyer, R. R. McDonald. Committee: F. R. W. Böhmer, G. Compton, H. Freese, W. Freese, W. Gillitt, H. W. Königkramer, H. W. Nichols, F. Schäfermann. Hon. Sec. and Treasurer: Frank J. Voek.

GOCRTON FARMERS' ASSOCIATION.—President: W. C. Stockil, Esq., J.P. Vice-President: M. Sandison, Esq. Hon. Secretary and Treasurer: Frederick B. Burnard, Esq.

HATTING SPRUIT FARMERS' ASSOCIATION.—President: Wm. Craig. Vice-President, J. Campbell; Committee: J. J. S. Maritz, G. De Waal, H. J. Hearn, Thos. Brookes, N. Guitz, H. Glutz, W. A. Queded, J. A. Brookes, W. J. Hislop, Thos. Dewar, J. Humphries, W. H. Tatham, A. E. Norman, D. W. H. Tandy; Hon. Secretary and Treasurer: R. J. Hearn.

HIMEVILLE AGRICULTURAL SOCIETY.—President: Henry C. Gold, Dartford, Polela. Vice-Presidents: W. Little, R. Justice, G. Malcolm. Executive Committee: G. Malcolm, W. S. Johnston, P. McKenzie, W. Little, G. Royston. Hon. Secretary and Treasurer: Thos. E. Marriott, Brookdale, Polela. Assistant Secretary: F. W. Fell, Ericksburg, Polela.

HOWICK FARMERS' ASSOCIATION.—Chairman, Thos. Morton; Vice-Chairman, M. A. Sutton; Hon. Secretary and Treasurer, A. Clark.

INGOGO FARMERS' ASSOCIATION.—President: Angus Wood, J.P. Vice-Presidents: G. A. Finstone and J. Browning. Hon. Secretary and Treasurer: C. Watt.

IXOPO AGRICULTURAL SOCIETY.—President: W. Arnott. Vice-Presidents: F. L. Thring, J.P., John Anderson, C. E. Hancock, J.P. Committee: W. K. Anderson, J.P., Thos. Allen, J. C. Auld, H. D. Archibald, F. S. Benningfield, S. Boyd, F. E. Foxon, R.M., Wm. Foster, Jas. T. Foster, Geo. E. Francis, L. Gray, A. M. Greer, J.P., J. R. Greer, Wm. Gold, Jno. Gold, H. A. Hill, C. F. Harriass, A. E. Keith, R. Kennedy, Geo. Martin, W. Oakes, L. J. Phipps, T. F. Remfry, J. W. Robinson, Jas. Schofield, M.L.A., A. Stone, W. R. Way, G. C. Way, A. H. Walker, M.L.A., J. L. Webb (F.R.C.V.S.). Hon. Sec: R. Vause. Hon. Ass. Sec.: C. K. D. Beales. Hon. Treasurer: T. Arnott.

IXOPO FARMERS' ASSOCIATION.—President: A. E. L. Keith, Ixopo. Vice-Presidents: Geo. Martin, Claybrooke, Ixopo; A. Kirkman, Lufafa, Ixopo. Hon. Secretary and Treasurer: Geo. E. Francis, Morningview Ixopo. Delegates to Farmers' Union: President and James Foster. Committee: F. Remfry, R. Vause, C. E. Hancock, John Anderson, R. Greer, W. Oakes, D. Campbell, G. C. Way, James Foster.

KLIP RIVER AGRICULTURAL SOCIETY.—President: Herman Illing; Vice-Presidents: J. T. Francis, J. G. Bester, W. Pepworth. Auditor: J. T. Francis. Esq. Secretary: E. Scott, F.L.A. (Lond.). Executive Committee: A. Brink, D.

Bester, J. Farquhar, C.M.G., W. C. Hattingh, J. G. Hyde, Trev. Hyde, A. L. Horsley, W. Freer, L. A. Leonard, H. Nicholson, J. H. Newton, J. T. Sandalls, W. H. Roberts, H. C. Thornhill.

LION'S RIVER DIVISION AGRICULTURAL SOCIETY.—President: Graham Hutchinson; Vice-President: H. Nisbet; Executive Committee: H. Nisbet, M. A. Sutton, A. J. Holmes, J. Humphries, Jno. Pole, and W. A. Lawton; Auditor: W. J. R. Harvard; Hon. Sec. and Treasurer: Arthur F. Dicks, P.O. Box 1, Howick.

LOWER TUGELA DIVISION ASSOCIATION.—President: T. G. Colne, brander. Vice-President: Lieut.-Col. F. Addison. Hon. Secretary and Treasurer: H. Curtis Smith. Committee: A. S. L. Hulett, A. E. Foss, G. Stewart, J. B. Hulett.

MID-ILLOVO FARMERS' CLUB.—Chairman: L. G. Wingfield-Stratford, J.P. Vice-Chairman: B. B. Evans. Hon. Secretary: J. W. V. Montgomery. Assistant Hon. Secretary: S. C. Phipson. Hon. Treasurer: Jos. McCullough.

MOOI RIVER FARMERS' ASSOCIATION.—President: C. B. Lloyd; Vice-President:—R. Garland; Hon. Treasurer: H. A. Rohde; Collector: Capt. W. H. Stevenson; Auditor: Claude Scott; Hon. Secretary: E. Cautherley.

MUDEN AGRICULTURAL ASSOCIATION.—President: Thos. Thresh. Vice-Presidents: Wm. Lilje, E. A. Grantham. Secretary and Treasurer: C. A. Selling. Committee: Otto Rottcher, Karl Lilje, Karl Rotter, Herman Schafer, Fritz Torlage, T. Braithwaite, Ernest Rottcher, C. H. Tilbrook, Rev. H. Rottcher (Hon. Life Member).

NEWCASTLE.—President: F. A. R. Johnstone, J.P. Vice-President: C. Earl, J.P., Mayor of Newcastle; Angus Wood, J.P., Ingogo; O. Schwikkard, C.M.G., Newcastle. Secretary: Wm. Beardall. Treasurer: Ed. Nicols. Executive Committee: L. H. S. Jones, E. Phillips, H. C. Caldecott, C. Watson, G. Langley, W. A. Lang, W. J. P. Adendorff, J. E. de Wet, O. Davis, S. W. Reynolds, B. Pettigrew, G. W. Thomas, G. H. Bishop, H. R. Muir, M. C. Adendorff, W. Napier, P. Van Breda, Chriss Botha, G. Tempier.

NEW HANOVER AGRICULTURAL ASSOCIATION.—President: R. H. Oellermann. Vice-Presidents: J. C. Watt, J.P., and J. A. Westbrook. Life Member: C. A. S. Yonge, M.L.A. Secretary and Treasurer: W. D. Stewart, New Hanover. Auditor: J. H. F. Hohls. Committee: W. N. Angus, E. Bentley, W. W. Bentley, Edward Boast, H. W. Boast, E. E. Comins, G. R. Comins, C. Crookes, jun., G. Demont, H. Dinklemann, J. Duval, W. Fortmann, Dr. C. H. Herbert, J. Hillermann, J. H. F. Hohls, H. Jacobson, H. A. Light, G. C. Mackenzie, A. F. Mackenzie, T. M. Mackenzie, J. Muirhead, J.P., G. Moe, J. Moe, O. Moe, C. Oellermann, F. Oellermann, R. H. Oellermann, J. C. Otto, H. Oellermann, E. Peckham, J.P., J. A. Potterill, S. Peckham, C. M. Scott, Rev. J. Scott, Wm. Schroder, J.P., Owen Solomon, J. H. Smith, Riby Smith, H. Thöle, F. Thöle, H. Vorwerk, H. F. Westbrook, J. H. Westbrook, C. Westbrook, T. Wolhuter.

NOODSBERG ROAD AGRICULTURAL ASSOCIATION.—President: Fritz Reiche, J.P.; Vice-Presidents: H. Mummbrauer, P. Rodehorst, W. Dralle, W. Wortmann; Committee: W. Bartels, F. Bosse, H. Brammer, A. J. Bruyns, H. Bruyns, Carl Dralle, H. Gebers, W. Gevers, J. H. Holley, jr., W. C. Holley, C. Hillermann, L. Koch, H. Köhler, F. E. Kuhn, M. Maister, H. Merens, A. Meyer, H. Meyer-Estorf, H. W. Meyer, K. A. Meyer, H. Misselhorn, W. Misselhorn, K. Peters, I. Pfothenhauer, G. Rabe, G. Reiche, Joh. Reiche, W. Rencken, H. Rosenbrock, H. Schmidt, K. Schmidt, Rev. Jas. Scott, K. Seele, F. J. Smith, J. Thies, W. Witthöft, P. Wortmann, A. Wortmann, F. Wortmann, H. Wortmann; Secretary: Paul Vietzen, P.O. Singletree; Hon. Treasurer: E. Beurlen.

NOTTINGHAM ROAD FARMERS' ASSOCIATION.—President: W. Henwood, J.P., Vice-President: B. Greene; Auditor: A. Mengens; Secretary and Treasurer: C. J. King, Nottingham Road.

RICHMOND AGRICULTURAL SOCIETY.—President: John Marwick. Vice-Presidents: W. P. Payn, A. W. Cooper, J. W. McKenzie and Chas. Nicholson. Honorary Treasurer: R. Nicholson. Hon. Secretary: Tom M'Crystal. Committee: J. W. T. Marwick, Evan Harries, R. A. McKenzie, F. O. Howes, H. M. Moyes, W. Comrie, Thos. Marwick, J. C. Nicholson, J. W. Flett and E. J. B. Ho-king.

ROYAL AGRICULTURAL SOCIETY OF NATAL.—President: Sir G. M. Sutton, K.C.M.G. Vice-Presidents: His Worship the Mayor, Messrs. Jas. King, O. Hosking, D. C. Dick, Col. E. M. Greene and P. D. Simmons. Executive: Sir G. M. Sutton, President; Messrs. Jas. King, O. Hosking, D. C. Dick, Col. E. M. Greene and P. D. Simmons, Vice-Presidents; Committee: G. J. Macfarlane, W. S. Cratt, W. H. Cobley, H. J. Stirtion, W. J. O'Brien, L. Line and Sir T. K. Murray. Yard Superintendent: H. J. Stirtion. Secretaries, Treasurers and Collectors: Duff, Eadie & Co., 12, Timber Street, Pietermaritzburg. Auditor: G. V. Lambert.

SLANG RIVER (UTRECHT) FARMERS' ASSOCIATION.—Chairman: P. J. Kemp; Executive Committee: J. J. Uys, J. Z. Moolman, T. J. Botha, P. J. Viljoen, P. J. Kemp; Hon. Sec. and Treasurer, Thys Uys, Utrecht P.O.

UMVOTI AGRICULTURAL SOCIETY.—President: Major T. Menne. Vice-Presidents: Theunis J. Nel, M.L.A., W. J. Slatter, W. L'Estrange. Executive Committee: Tol Nel, A. Newmarch, W. Lilje, O. Rottcher, S. C. Van Rooyen, W. Newmarch, E. J. Van Rooyen, O. Norton, I. M. Nel, J. Browning. Managers of Show Yard: J. M. Handley and N. Hunter. Hon. Auditor: W. K. Ente. Secretary and Treasurer: W. H. Gibbs.

UPPER BIGGARSBERG FARMERS' ASSOCIATION.—President: George Langley; Vice-President: W. L. Oldacre; Secretary: J. H. Murray.

UTRECHT AGRICULTURAL SOCIETY.—Chairman: L. Viljoen; Vice-Chairman: B. H. Breytenbach; Members: I. Biernan, M. M. Knight, J. H. Klopper, B. C. Hattingh, T. Botha, M. Gregory, P. L. Uys, H. P. Breytenbach; Secretary: G. J. Shawe.

VICTORIA COUNTY AGRICULTURAL SOCIETY.—President: Lieut. Colonel F. Addison; Vice Presidents: Sir Liege Hulett, Kt., M.L.A., W. J. Thompson, Esq., J.P., J. Polkinghorne, Esq., M.L.A.; Committee: Messrs. W. H. B. Addison, G. S. Armstrong, M.L.A., C. Bishop, J.P., D. Brown, sen., J.P., W. Campbell, T. G. Colenbrander, A. E. Foss, J.P., A. S. L. Hulett, J.P., J. B. Hulett, C. Jackson, G. Nicholson, J.P., T. Polkinghorne, J. W. Perkins, J.P., E. Saunders, J.P., G. Stewart, and J. H. Stansell; Hon. Secretary and Treasurer: H. Curtis Smith (Stanger).

WEENEN AGRICULTURAL SOCIETY.—President: A. F. Henderson, Esq., C.M.G.; Vice-Presidents: J. Button, J.P., Jas. Ralfe, J.P., H. Blaker, J.P., E. B. Griffin, J.P.; Hon. Treasurer: F. C. Schiever; Auditor: S. Wolf; Executive, Hon. H. D. Winter, R. H. Ralfe, J. W. Moor, D. W. Mackay and Allan Stuart; Manager of Show Yard: S. Vaughan; Assistant: A. Clouston; Hon. Secretary: E. Cautherley.

WEENEN COUNTY HORTICULTURAL SOCIETY.—Committee of Management: A. F. Henderson, C.M.G., F. C. Schiever, G. W. Linfoot, P. J. Mun, Dr. Brewitt, S. Vaughan; Hon. Secretary: E. Cautherley.

ZULULAND FARMERS' ASSOCIATION.—President: F. W. White; Vice-President: C. E. Symonds. Committee: J. J. van Rooyen, A. W. Symonds, H. T. James, R. J. Ortepp, J. P. Kokemoer.

ZULULAND COAST FARMERS' ASSOCIATION.—President: G. H. Hulett; Vice-President: C. Hill; Hon. Secretary and Treasurer: F. Brammage, Ginginhlovu.

(The Editor will be obliged if the Hon. Secretaries will supply him with lists of the Executives of their Associations.)

Trees for Sale.

To encourage tree-planting, transplants and seeds of forest trees are supplied by Government, so far as in stock, at the undermentioned rates, exclusive of carriage, from the Government Nursery, Central Experimental Farm, Cedara.

Transplants of Eucalyptus, Pines, Acacias, Casuarinas, Cupressus, etc., about 25 trees in each tin, at 8s. 4d. per 100 trees. Trees in separate tins at 1s. each.

Transplants of scarce kinds, larger trees, or surplus stock, when available, will be charged at special rates, which will be furnished on application.

Tree seeds, in variety, at 1s. per packet. Price per pound, which fluctuates, will be furnished on application.

Package and postage of seed, when required, charged 1s. per lb. extra.

Orders for present or spring delivery should be addressed to the **Forester, Cedara**, and must be accompanied by a remittance in cash or postal order. Cheques cannot be accepted.

T. R. SIM,
Conservator of Forests.

Agricultural Shows.

HIMEVILLE, Thursday, 16th May.—President : H. C. Gold. Hon. Secretary : Thos. E. Marriott, Brookdale, Poteia.

BULWER, Wednesday, 22nd May.—All entries close 10th May. President : J. Isbister. Secretary : D. McK. Malcolm, Bulwer.

ROYAL AGRICULTURAL SOCIETY, 13th, 14th and 15th June.—All entries close 1st June. President : Sir G. M. Sutton. Secretaries : Messrs. Duff, Eadie & Co., 12, Timber Street, Maritzburg.

ESTCOURT, Wednesday, 19th June.—All entries close 8th June. President : A. F. Henderson. Secretary : E. Cautherley, Southdowns, Estcourt.

HARDING, Thursday, 20th June.—All entries close 6th June. President : A. G. Prentice, J.P. Secretary : Thos. Tribe, Harding.

DUNDEE, Thursday, 27th June.—All entries close 12th June. President : F. Turton. Secretary : J. McKenzie, Dundee.

HOWICK, Thursday, 27th June.—All entries close 12th June. President : Graham Hutchinson. Hon. Secretary : Arthur F. Dick, Howick.

NEWCASTLE, Friday, 28th June.—All entries close 18th June. President : F. A. R. Johnston, M.L.A. Secretary : Wm. Beardall, Newcastle.

LADYSMITH, Friday, 5th July.—All entries close 30th June. President : Herman Hing. Secretary : E. Scott, Box 90, Ladysmith.

CAMPERDOWN, 5th July.—President : John Moon. Hon. Secretary : — Wilson.

UMZINTO, Thursday, 11th July.—All entries close 9th July. President : W. Thomson. Secretary : George Lamb, Umzinto.

DURBAN, 18th, 19th and 20th July.—President : W. R. Poynton. Secretary : J. D. Ballance.

RICHMOND, Thursday, 25th July.—All entries close 12th July. President : John Marwick. Hon. Secretary : T. McCrystal, Box 32 Richmond.

DATES NOT FIXED.

GREYTOWN (Date not fixed).—President : Major T. Menne. Secretary : W. H. Gibbs, Greytown.

MID ILLOVO (Date not fixed).—President : B. B. Evans. Secretary : C. B. Lowe, Mid Illovo.

NEW HANOVER (No Show on account of E. C. F.).—President : R. H. Oellermann. Secretary : W. D. Stewart, New Hanover.

NOODSBERG ROAD (Date not fixed).—President : Fritz. Reiche, J.P. Secretary : Paul Vietzen, P.O. Singletree.

STANGER (Date not fixed).—President : F. Addison. Secretary : H. G. Smith.

OTHER SHOWS.

PIETERMARITZBURG HORTICULTURAL SOCIETY, 17th October.—President : T. R. Sim, F.L.S. Hon. Secretary : S. Colman, Deeds Office, Maritzburg.

Brands Allotted to Infected Magisterial Divisions.

The following is a list of the brands which have been allotted to the several infected Magisterial Divisions :—Durban County, D. 2 ; Alexandra County, A. 2 ; Lower Tugela, T. 2 ; Mapumulo, S. 2 ; Inanda, B. 2 ; Umsinga, U. 2 ; Dundee, X. 2 ; Vryheid, V. 2 ; Ngotshe, H. 2 ; Paulpietersburg, P. 2 ; Nongoma, G. 2 ; Mahlabatini, L. 2 ; Ndwedwe, N. 2 ; Weenen County, W. 2 ; Umvoti, F. 2 ; Hlabisa, K. 2 ; Eshowe, E. 2 ; Ladysmith, R. 2.

Employment Bureau.

THE Department of Agriculture has received applications from the undermentioned, who are prepared to become assistants or apprentices on farms. The Department will be glad to hear from farmers willing to take young men as assistants, and to place them in correspondence with the various applicants. When communicating on the subject, farmers may refer to the applicants by quoting the numbers in the following list:—

No. 92a.—Englishman, 50 years of age, with varied experience in tea and coffee planting in Ceylon, and also of contract work. Has also been on a Sugar Estate, and has had experience in pig rearing. Salary needed.

No. 94.—Cotehman, who has lived all his life in South Africa, desires employment on farm in connection with stock if possible. Was a Head Conductor during Boer War. Was 2 years with Transvaal P.W.D. as handyman. Produces good references. Desires salary.

No. 95.—German, of respectable appearance, who speaks English fluently, desires employment on a farm. Is 48 years of age, and has been accustomed to farm work, wire fencing, masonry, carpentry, &c. Salary required.

No. 97a.—Colonial, aged 22, bricklayer by trade, speaks Zulu, Dutch, and Hindustan, desires employment as a farm hand. Was on a farm in vicinity of Pretoria for six months.

No. 98.—Englishman, 25 years, desires situation on sheep and stock farm. Had experience of sheep on father's farm in Lincolnshire. Has been four years in Natal.

No. 99.—Englishman, 17, Colonial born, anxious to learn farming. No previous experience.

No. 100.—Englishman, 23, with experience gained in Richmond district, desires to get on to farm further up country. States he is active and not afraid of work. Wage no particular object.

Diamond Drilling.

SOME of the departmental diamond drilling plants are at present disengaged and available for hire for boring for either minerals or water. Particulars as to terms of hire may be obtained from the undersigned.

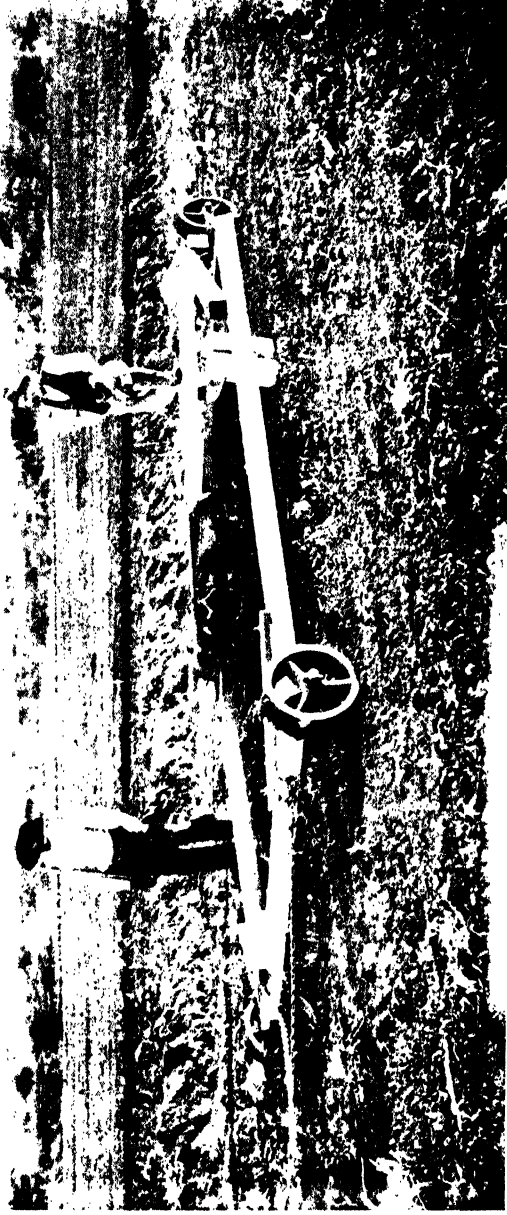
CHAS. J. GRAY,
Commissioner of Mines.

Bulletins Issued by the Department of Agriculture.

Single copies may be obtained free (excepting those with price attached) on application to the Secretary, Minister of Agriculture.

No.

- 1.—"Notes on Fruit Culture," by Claude Fuller. [1902]. (*Out of print*).
- 2.—"Manures on the Natal Market, 1902," by A. Pardy. [1902].
- 3.—"Insects in an Important Role," by Claude Fuller. [1904]. (*Out of Print*).
- 4.—"Manures on the Natal Market, 1903," by A. Pardy. [1903].
- 5.—"Weed Circular," by Claude Fuller. [1905].
- 6.—"Manures on the Natal Market, 1904," by A. Pardy. [1904].
- 7.—"Tree-planting in Natal," by T. R. Sim. [1905]. (*Price 2s. 6d.*)
- 8.—"Agricultural Co-operation," by E. T. Mullens. [1905]. (*Out of Print.*)
- 9.—"Potato Culture," by A. N. Pearson. [1906].
- 10.—"Manures on Natal Market, 1905," by A. Pardy. [1905].
- 11.—"Agricultural Statistics, Natal, 1904-5." [1906].
- 11.—"East Coast Fever," by S. B. Woollatt. [1906].
- 12.—"Manures on Natal Market, 1906," by A. Pardy. [1906].



GRADER.
Weenen Experiment Station

Natal Agricultural Journal and Mining Record.

The Cultivation of Lucerne.

By E. R. SAWER, Director Experiment Stations.

THE rank growth of weeds among broadcast lucerne has during the past two seasons led to serious loss both by way of diminished yields and lower prices for consignments most affected. The presence of impurities in the cured hay is an outcome to be strenuously avoided if market reputation is to be secured and maintained, and so long as lucerne is to be regarded as a staple crop of our irrigated lands no effort can be spared in eliminating this undesirable feature.

With a view to demonstrating the advantages accruing from a system whereby the crop is drilled and regularly cultivated, a series of plots was organised at the Weenen Experiment Station, results from which are now to hand. The ground selected for the experiment is a light sandy loam of good depth, lying under the furrow. After preliminary cultivation the manures detailed in the following table were broadcasted and worked into the land with the Martin Cultivator. The lucerne was then drilled in 18-inch rows at the rate of 13½ lbs. of seed to the acre. After the third and subsequent cuttings the plots set aside for the purpose were thoroughly hoed. The effect of this operation in checking growth of weeds was from the first very marked, and a progressively increasing yield of hay is being secured. All data are computed upon the acre basis. With a view to securing uniform conditions throughout the plots, no irrigation water was employed, results being

secured during the months of summer rainfall, amounting to approximately 38 inches.

CULTIVATION AND MANURING OF LUCERNE.

Plots.	Dates of Cutting.						Total.	Treat- ment.	Manures.
	8 10/06	21 11/06	20 12/06	28 1/07	21 2/07	16 3/07			
	lbs.	11 s.	lbs.	lbs.	lbs.	lbs.	lbs.		
Border	55	54	53	...	86	89	...	...	...
39	1,050	1,770	1,620	3,900	5,940	6,000	20,280	C & M	Superphosphate, 390 lbs.; Potash, 150 lbs.
40	1,080	1,800	1,770	3,120	4,440	4,470	16,680	C & M	Superphosphate, 390 lbs.
41	1,440	2,070	2,100	2,610	4,140	4,170	16,530	C	...
42	1,530	2,160	2,130	2,670	5,610	5,520	19,620	C & M	Potash, 150 lbs.
43	1,560	2,130	2,070	3,720	5,520	5,580	20,580	C & M	Slag, 390 lbs.
44	1,950	2,520	2,430	3,600	4,560	4,500	19,560	C	...
45	2,040	2,700	2,670	3,120	4,200	4,140	18,870	C & M	Bone Dust, 390 lbs.
46	2,040	2,700	2,610	3,360	3,960	4,020	18,690	C & M	Lime, 990 lbs.
47	1,800	2,340	2,280	2,700	3,540	840	13,506	...	...
48	2,130	2,880	2,790	2,790	4,290	4,200	19,080	C	...
49	2,160	2,840	3,000	2,370	4,290	900	15,660	M	Superphosphate, 390 lbs.
50	1,830	2,706	2,640	2,940	5,250	540	20,760	C & M	Superphosphate, 390 lbs.
51	2,310	3,000	2,670	2,010	3,300	720	13,710	M	Slag, 390 lbs.
52	2,010	2,820	2,790	2,730	3,360	3,420	17,130	C & M	Slag, 390 lbs.
53	1,650	2,160	2,130	1,980	1,950	900	10,776	...	...
54	1,470	2,100	2,040	1,980	2,520	2,820	12,930	C	...
55	2,250	2,970	2,940	2,700	3,000	2,040	15,900	M	Bone Dust, 390 lbs.
56	3,030	3,180	3,060	4,470	2,940	3,000	19,680	C & M	Bone Dust, 390 lbs.
Border	58	56	58	44	38	40	...	...	...

A partial drought preceding the March cutting served to accentuate the beneficial results of cultivation. It will be noted that the manured and uncultivated plots yielded to this final cutting little more than the

unmanured plots. All weights quoted are for freshly-cut uncured lucerne.

Increase in yield per acre over six months due to:—

	lb.
Cultivation only (average)	4,890
Bone Dust only	3,465
Superphosphate only	3,525
Potash (deduced) only	2,580
Lime (deduced) only	1,665
Slag only	1,515
Cultivation, Superphosphate and Potash	8,115
Cultivation and Bone Dust	7,140
Cultivation and Superphosphate (average)	6,585
Cultivation and Lime	6,555
Cultivation and Slag	4,995

The above results all serve to accentuate the value of constant cultivation, the direct returns to which exceed those secured from any dressing of fertiliser applied to uncultivated plots. It also appears that the value of superphosphate is largely increased by the addition of potash, which combination furnished the highest return from cultivated plots. The value of bone dust as a lucerne fertiliser is demonstrated, and, pending the completion of further comparative tests in which bone dust has been associated with potash manures, the relative costs of the combined superphosphate-potash fertiliser and bone dust will determine selection for commercial purposes.

The great secret of success with lucerne lies in thorough and frequent cultivation, both on irrigated and dry land. In recognition of the varying conditions of soil and cultivation, two distinct machines have been devised for the purpose. For dry land, and especially if there be danger of the surface soil hardening to a crust, we know of no better machine than the Martin Cultivator, a well-known implement, which should be fitted with special diamond-shaped lucerne-tines. For irrigated land, the Moline Rotary Digger, an implement only recently introduced into South Africa, can be recommended. After the first cutting a light tooth-harrow should also be drawn over the field, and in the second season the spreading or disc-harrow will open the crowns of the lucerne and promote stooling, the operation resembling the cross-cut made on a cabbage stalk after removal of the head for the purpose of stimulating second growth. If the land be at all foul in spite of inter-row cultivation, the discs should be set at as wide an angle as possible, when they will turn up the weeds in the rows and make a good dust mulch.

Notes and Comments.

ILLUSTRATED BLOCKS.—An enquiry having been made regarding the willingness of the Department to insert illustrated blocks of stud animals which are at the disposal of the public, it is hereby notified that the Department is at all times willing to insert such illustrated blocks on the owners of the animals bearing the necessary expense, the blocks, of course, remaining the property of the owners of the animals.

SOUTH AFRICAN PRODUCTS EXHIBITION.—Mr. T. R. Sim, who has now returned to duty, claims that Natal's exhibits at the Exhibition were equal to those from the other South African Colonies in all cases except fruit, and that the variety was greater than from any of the other Colonies. He emphasises the necessity for sending only the best products to distant markets, and also for being satisfied with normal prices for quantity rather than fancy prices for a few dozen. He points out that there is a demand for everything of high quality that can be exported, if it can be marketed in England at a price that will enable it to compete with the world, but in the meantime that most lines fetch higher prices in Natal than abroad. He remarks that there is still much to do in the direction of bringing the culture and grading of fruit up to the standard required for export. The Committee of the Exhibition have not yet announced what awards are to be given.

CYANIDE MANUFACTURE IN SOUTH AFRICA.—In the June number of *South African Commerce* it is stated that a company has been formed in Johannesburg, with a capital of £50,000, of which £10,000 is working capital, for the manufacture of cyanides, soda crystals and other alkali compounds. Mr. J. A. Millar, Chairman of the Pharmaceutical Society of Natal, is to be the technical manager of the company, which is to be known as the South African Cyanide Company. It is hoped to manufacture magnesium cyanide, using local magnesite. A producer gas furnace will furnish the heat necessary to bring about the combination of the atmospheric nitrogen with the carbon and magnesium. The magnesite, together with a proportion of powdered charcoal, will be passed through a revolving furnace heated by producer gas, and it is hoped to get as much as 98 per cent. of the magnesite converted into magnesium cyanide. The soda crystal plant is an extensive one, and the Company intends to import the anhydrous soda and convert to washing soda. This is a common article of household use, and a large quantity is annually imported. It is intended to add other chemical lines as the Company progresses.

INDENTURED INDIANS.—Mr. C. H. Haggart has given notice of the intention to introduce a Bill this session to prohibit the introduction of any more indentured Indians into Natal, and to provide that all indentured Indians now in the Colony shall be repatriated on the expiration of their indentures. A penalty of £200 is sought to be imposed on anyone importing any more Indians after the passing of the Bill.

EXPORT OF PEARS AND APPLES.—A correspondent writes to the Secretary, Minister of Agriculture, with regard to a consignment of pears and apples that he sent, as an experiment, to the English market. He has received a report on this fruit, in which it is stated that, with only one exception, all the fruit arrived in perfect condition. That exception was a pear which the sender had thought was too ripe: it arrived quite rotten. The pears were valued at from sixpence to ninepence each and the apples twopence to threepence each. The correspondent in question hopes next year to send from 500 to 1,000 cases to England.

AGRICULTURAL BILLS.—In the *Gazette* of the 11th inst. are published Bills to amend the Tuberculosis, Lung-sickness, Mange, and East Coast Fever Acts. The Tuberculosis amendment is to empower the Department to test, with tuberculin, all cattle imported into the Colony whether by sea or by land and whether accompanied by certificates or not. In the event of any such animal being proved to be affected with Tuberculosis, it must either be destroyed or returned whence it came. Cattle imported for slaughter are to be branded, and slaughtered within one month. These conditions are necessitated by the fact that, at present, many imported animals arriving with certificates are subsequently found to be diseased. The Lung-sickness Act is to be amended so as to extend the period of quarantine up to three months and to provide for renewal of such quarantine where that course may be deemed necessary. It also provides for the destruction of old "lungers," which experience has so often proved to be the cause of fresh outbreaks of lung-sickness. The Mange Bill which it is proposed to introduce is the same measure as that which passed the Assembly in a previous Session, but was thrown out by the Upper House. From this Bill has been deleted all reference to dogs, which was the cause of its rejection by the Council; and the measure now applies solely to horses, mules, and donkeys. This legislation was asked for by the recent Natal Agricultural Union. The East Coast Fever Bill is to give power to the Minister whenever he considers it necessary so to do in order to prevent the spread of the disease, to order the removal of cattle from an infected area or from any place adjacent thereto, and to dispose of them for immediate slaughter. It is in brief a Bill to give the power of stamping out the disease for which the majority of our Agricultural Associations is now asking. The Bill fixes the price to be paid for the cattle at from £2 to £7 for oxen, £3 to £7 10s. for cows, and £4 for bulls.

REDUCED RATES ON SOUTH AFRICAN GRAIN.—Reduced rates are now being charged on the Natal Government Railways for the conveyance of grain in lots of not less than ten tons, or paying therefor, for export oversea from stations in the Transvaal and Orange River Colony to the Point (Durban). The rates are one-fourth of the rates of carriage upon South African wool, subject to a minimum of 13s. 4d. per ton from Transvaal stations and 9s. 6d. per ton from O.R.C. stations, at owner's risk. Ordinary rates are charged in the first instance, and rebates reducing to the export rate granted on production of Customs proof that the grain has been *bona fide* exported oversea beyond South Africa. Further particulars in regard to the rates may be obtained on application to the General Manager's Office, Maritzburg.

NATIVES AND LAND.—At a special meeting of the Transvaal Landowners' Association, held recently, the following resolution was carried unanimously:—"That this special general meeting of the Transvaal Landowners' Association urges upon the Government the necessity for the more efficient control of the natives squatting upon Crown lands, and would point out that such control can only be made effective by increasing the number of native rent collectors, and not by the present policy of reduction. Further, for the purpose of increasing the supply of native labour for farming and other purposes, it is necessary not only to actually and effectively collect the rents from the natives squatting on Crown lands, but also to charge adequate rentals according to the agricultural value and area of the land occupied. That this Association urges the Government to maintain the principle of limitation of the right of natives to acquire freehold or registered leasehold of land, either individually or collectively, outside those areas set apart by Government for natives, and to legislate for the effective fulfilment of this principle."

EXPORT OF CATTLE FROM ARGENTINA.—The Consul-General for the Argentine Republic at Capetown has advised the Colonial Secretary, Natal, that a decree was issued by the Argentine Republic on the 11th March cancelling, as regards the Province of Buenos Aires, the decree of April 20th, 1906, which prohibited—as a consequence of an outbreak of foot-and-mouth disease—the export of cattle, sheep, goats and swine oversea from the Republic. This re-opening of the ports to cattle, sheep, goats and swine from the Province of Buenos Aires, for oversea export, has been allowed, the Consul-General states, in view of the satisfactory general sanitary state of the flocks and herds of the Republic, and also of the fact that no case of the disease in question was notified or found in the said Province during the three months immediately preceding the 11th March, while the last outbreak prior to that period was of one single case, of a mild character. The sanitary restrictions for preventing the entry of cattle

from other Provinces or territories not yet declared immune are in full force. Within the Province of Buenos Aires itself, all cattle, sheep, goats or swine for oversea export are examined, at the establishment where they have been selected, by the official veterinary inspectors, and cannot be entrained except with a permit from the Ministry of Agriculture. Moreover, they must be under sanitary observation during the last twenty-four hours prior to being embarked, and are during that time again examined carefully by the Inspectors, in order to prevent the shipment of any animal that is not healthy or that presents suspicious symptoms, or is otherwise physically unfit. These precautions, says the Consul-General, appear to amply ensure the shipment of only such animals as are in a healthy condition.

QUEENSLAND SUGAR WORKS GUARANTEE ACT.—In the *International Sugar Journal* for September, 1906, there appeared a resume of the section on the sugar industry of Queensland in the *Year-Book of Australia*. It was stated that the Queensland Government had advanced, up to the commencement of 1905, a sum of £583,286, under the Sugar Works Guarantee Act, to certain sugar and other mills and a tramway. Eight of these mill companies failed to meet their monetary obligations to the State, the liabilities incurred by the Government in respect of defaulting companies and the tramway being £415,000. "Six of these mills," the article stated, "have now passed into the possession of the Government." It would thus appear that, if money is advanced to put down plant and tram-lines, and if the properties have to revert to the Government, the sugar industry is costing far more than the duty plus the bounty less the excise. In other words, without considerable State assistance, these central sugar mills do not pay. With a view to ascertaining whether this was the case, and what was the present position of affairs, and also how far the loss sustained by the Government was really an additional bounty on sugar, the Secretary, Minister of Agriculture, on the suggestion of Mr. J. Kirkman, M.L.A., wrote to the Secretary for Agriculture, Brisbane, on the subject. The Under Secretary to the Treasury, replying on the 9th May, states that the total amount of public monies advanced by the Treasury for the building and equipping of Central Sugar Mills was £589,482, the advances being subject to repayment during a period extending over 21 years. Principal has been paid to the extent of £172,756, and interest at the rate of 4 per cent. per annum amounting to £183,683. The amount of principal still owing is £416,726, and the arrears of interest £51,968, making a total of £468,694 still outstanding. The principal due, but unpaid, amounts to £32,907, which, added to the arrears of interest, as above, makes the total of arrears £84,875. These figures represent the situation on 1st January, 1907. The position of six of these Government Central Mills was so extremely unsatisfactory, the Under Secretary pro-

ceeds, that the Treasurer entered into possession and assumed the absolute control and management of the mills. In the case of three other mills a partial control was assumed, which very quickly resulted in bringing these into a better financial position. Of the six Central Mills into which the Treasurer, as mortgagee, actually entered into possession, two had so far improved their position that the original companies have been enabled to find the money to pay off the Public Treasury and to regain possession of the mills. By the re-sale of these two mills the Treasury recovered something over £90,000 of the monies that were originally advanced. The four remaining mills of which the Treasurer entered into possession as mortgagee have been foreclosed by the Treasurer. They are now the absolute property of the State and are being controlled and conducted for the benefit of the cane-growing farmers who were the shareholders. Owing to favourable seasons, to fair prices for raw sugars, and to the control of the mills by the State itself with the application of modern methods of management, all these mills are now recovering their financial position, and it is believed that they may be placed upon a sound running basis, resulting ultimately in the total recovery of the monies advanced by the State for their establishment.

MARTYNIA FRAGRANS.—In this issue will be found an illustration showing the seed-pods, green and ripe, of a plant that is occasionally come across in Natal, known as *Martynia fragrans*. The plant is not indigenous to Natal, seeds of it having been introduced from Mexico some years ago. The genus comprises about ten species, natives of the warmer regions of America. They are sometimes annual and sometimes with a large tuberous perennial root. *M. fragrans* is the best-known species. This thrives in well-drained, porous soil, in a warm, sheltered situation, and grows to a height of about two feet. The flower is crimson-purple, with a yellow throat, large and fragrant, and disposed in handsome spikes. The fruit, which is from three to four inches long, terminates in two curved beaks or hooks which, held together in one covering whilst green (see lower pod in illustration), burst forth and separate upon ripening, as shown in the upper portion of the illustration. If gathered when young, the fruit is said to make an agreeable pickle in vinegar; but the plant has otherwise no economic value, and is an acclimatised weed. The hooks with which the fruit terminates are of interest. By their means the dissemination of the plant is assisted, as the hooks become caught in the hair or wool of animals grazing, and so the pods are carried some distance before they are dropped or rubbed off. Another species, *M. diandra*, is common in the Gangetic Plains, Chutia Nagpur, Bombay, and elsewhere in India, the fruit of which is officinal in the Punjab bazaars. It is sold in the drug-shops as an antidote to scorpion stings.

"STANDARD FIFE" WHEAT.—Whilst in England the Prime Minister gave instructions for "Standard Fife" wheat to be sent to Natal for distribution among farmers for experimental purposes. The wheat has now arrived at Cedara; and a supply having been set aside for trial on the Experiment Farms, the balance is available for distribution. Early application should be made for small samples by those desirous of giving this particular kind of wheat a trial. Correspondence should be addressed to the Director of Experiment Stations, Cedara. The only conditions on which the seed will be supplied is that a similar quantity of seed be returned to the Department of Agriculture next season, and that a report be furnished upon the success or otherwise attending the trial of the wheat.

AGRICULTURAL SCIENCE.—A recent issue of the *Agricultural Gazette* (England) contains an interesting article, by Mr. John Wrightson, on "Agriculture a Learned Profession." "No wider subject can be named than agriculture," the writer says, at the outset; "and the man who thoroughly understands the land and its capabilities is yet to be born—nay, is not in the least degree likely to be born." Meteorology, biology, mineralogy, pathology, chemistry, biology—including hybridisation, reversion, heredity, pathology, acclimatisation, anatomy, physiology, embryology, bacteriology, botany, entomology, and zoology—mechanics, engineering, mathematics, history, religion (*e.g.*, the effects of religion), the growth of laws—all these subjects must be taken cognizance of by the student of agriculture. "To understand the theory of agriculture, in all its bearings, is beyond the powers of any man, however learned," says Mr. Wrightson, "and yet a Professor of Agriculture ought to be able to throw light upon any of the subjects just enumerated." He distinguishes between "farming" and "agriculture," in order to show that the farmer must be an outdoor, practical man, whilst a professor of agriculture must necessarily be a student, and by his work throw as much light upon his subject as conditions will allow. The vast field of agriculture and the importance of the whole subject is seen in the fact that, in every country that is at all up-to-date, it is recognised as necessary to appoint specialists to study the various branches of agricultural science and apply the results of their investigations to local conditions, as well as to study local problems connected with their particular branch of the subject. In Natal, for example, we have specialists in general agriculture, in entomology, bacteriology and veterinary science, forestry and botany, agricultural chemistry, dairying; and the results of the investigations of these experts are from time to time made known to farmers generally. In these days the farmer can never hope to investigate at all widely for himself; he can only take the results of the investigations of others who are making a life-study of their work, and utilise those results in his practical work. Therein lies the distinction that Mr. Wrightson draws between "farming" and "agriculture."

Coffee Growing in Natal.

A REMEDY FOR LEAF DISEASE.

By E. R. SAWER, Director, Experiment Stations.

THE re-establishment of an industry in coffee cultivation upon a sound and reliable basis would be welcomed universally by those who realise that the climate and soils of the Natal Coast furnish well nigh ideal conditions for the growth of the shrub.

Elevation, humidity, and mean temperature, leave little to be desired, and the *sine qua non* is preventative or remedial treatment for leaf disease in coffee (*Hemiteia vastatrix*) and adequate protection against the "Borer" beetle. A contribution to the former subject of no little importance has been made by Mr. W. A. Gilbert, of the Barnesdale Tea Estate, Ifafa (formerly owned by the late Mr. J. A. McMillan, but now under the proprietorship of Messrs. Bazley Bros., of Nil Desperandum, close by). Mr. Gilbert, it would be as well to add, is the son of a very old and experienced Indian planter, and has himself had, besides tea, a long and varied experience in coffee growing in India. On assuming management of Barnesdale, Mr. Gilbert discovered an eight-year-old block of coffee which had been abandoned to the ravages of *Hemiteia*. The trees which were out of reach were sawn right down in 1903, and single suckers or leaders obtained. These were topped at 5 feet and lateral growth encouraged, which was carefully pruned and handled out each year. When leaf disease showed itself the following year, the field was left unweeded for some months till a fairly high growth of grass and weeds was obtained. These were then mown, allowed to dry *in situ*, and subsequently fired throughout the block. This treatment had the immediate effect of scorching the coffee foliage, but this was rapidly replaced, and it was seen that all traces of the disease had been eliminated. No re-infection has ensued until the present time, when a few bushes on the edge of the field, which is skirted by bush, are showing a few spots of the disease, and which are to be treated again in the manner described.

The remedy employed is deserving of special attention, as a few isolated trees on another portion of the estate about $\frac{1}{2}$ mile distant are covered with the fungus, and some coffee on a neighbouring farm three miles away, practically extinct from this cause, exists as a centre of distribution for the spores.

The accompanying illustrations show trees representative of the bulk of the field, now in full bearing, and clearly demonstrate that the



COFFEE TREES AT BARNESDALE ESTATE, IFAFA.



check sustained by the trees as a result of grass firing is inconsiderable. It would therefore appear feasible to employ this drastic method as often as infection may be sustained, and its general adoption, coupled with the destruction of such native bushes and trees as may hereafter be shown to harbour the fungus, may be the means of reducing the element of risk from this cause to a minimum.

It is also interesting to note that Mr. Gilbert is trying the effect of shade on his coffee bushes, and to this end has planted a portion of the field with *Grevillia robusta* (Silver Oak). Coffee under this shade seems remarkably healthy, and free of disease; and Mr. Gilbert now intends, being quite satisfied that, as in India, shade is essential to coffee even in Natal, to place the whole area under Silver Oak.

The World's Cane Sugar Crop.

MESSRS. WILLETT & GRAY'S estimate of the world's cane sugar crop on May 16th, 1907, is as follows. The figures include local consumption of home production wherever known:—

	1906-7. Tons.	1905-6. Tons.	1904-5. Tons.
America	3,317,000	3,243,728	3,001,168
Asia	1,172,046	1,149,341	1,126,708
Australia and Polynesia	249,000	230,000	216,213
Africa	295,000	283,364	232,101
Europe (Spain)	15,000	14,512	18,592
Total cane sugar crops	5,048,046	4,920,945	4,594,782
European beet sugar crops (F. O. Licht)	6,700,000	6,933,649	4,708,758
U.S. beet sugar crops (W. & G.)	433,010	283,717	207,722
Grand total cane and beet sugar	12,181,056	12,138,311	9,513,262
Estimated increase in the world's production	42,745	..	..

The Department receives certain sugar journals, which contain a large amount of statistical and other information regarding the world's sugar market. Those interested, who desire information on any particular point, are invited to communicate with the Department.

De-Natured Alcohol.

By G. C. WILLIAMS.

THE short article in the *Journal* of April last by "Ergates" was very *apropos* of what I have been going to write about for some time: that is, the splendid opening there is at the present for our Colony to supply the whole of South Africa with de-natured spirit or alcohol for use in motors of all kinds and also lamps. That there are immense possibilities in the realisation of such a state of things I will now endeavour to show. We are, as all know, suffering from a commercial depression, and it is generally admitted that any amelioration of this condition must be sought in the direction of agriculture. It is agriculture that will produce this spirit, and it only remains for our Government to do all in its power to encourage the production of a suitable matrix and then make such laws as will facilitate its extraction and sale for industrial purposes. If this is done, private enterprise will soon do the rest; and once this is consummated everyone is going to benefit who either uses or produces this Colonial product. It may not be known here what an important question this one of fuel is not only to South Africa but to the world. There can be no doubt in the mind of any one who gives the matter a thought that the world is now living on its capital, and that although the day may be distant yet it will surely come when we shall be bankrupt of both coal and oil, and new conditions will have to be faced. Our knowledge shows that it will be vegetation—the growing plant—that we shall have to turn to.

Potatoes, wheat, rice, beet, and sugar cane are the principal sources from which alcohol is derived, and it is from the last-named that our Colony will at first and immediately be able to produce spirit to put upon the market in no small quantities. I am informed by one of the sugar-growers on the Coast that some one million gallons of spirit could be made at once, fit for industrial purposes, and that this could be sold at a profit to them at a price of one shilling a gallon. At present this is lost to the Colony. Experiments have been made both in Germany and United States America, that prove without doubt that alcohol can be used in most kinds of motors and lamps, and can even compete in cheapness with petrol, gasoline, and petroleum. If this is the case in countries where petroleum is close and plentiful, how much more economical it should be in a country like South Africa whose oil comes overseas some 6,000 miles.

In America, after an exhaustive series of trials of alcohol and gasoline in farm engines, the following conclusions were come to:—



COFFEE PLANTS.
Mr. Gilbert's Barnesdale Estate.

1. Any engine on the American market to-day operating with gasolene or kerosene can operate with alcohol fuel, without any structural alteration whatever, with proper manipulation.

2. Alcohol contains approximately 0.6 of the heating value of gasolene by weight, and in the experiments a small engine required 1.8 times as much alcohol as gasolene per horse power hour. This corresponds very closely with the relative heating value of the fuels, indicating practically the same thermal efficiency with the two when vapourisation is complete.

3. In some cases carburetters designed for gasolene do not vapourize all the alcohol, and in such cases the excess of alcohol consumed is greater than indicated above.

4. The absolute excess of alcohol consumed over gasolene or kerosene will be reduced by such changes as will increase the thermal efficiency of the engine.

5. The thermal efficiency of these engines can be improved when they are operated by alcohol, first by altering the construction of the carburetter to accomplish complete vapourization, second by increasing the compression very materially.

6. An engine designed for gasolene or kerosene can, without any very material alterations to adapt it to alcohol, give slightly more power (about 10 per cent.) than when operated by gasolene or kerosene, but this increase is at the expense of greater consumption of fuel. By alterations designed to adapt the engine to new fuel, this excess of power may be increased to about 20 per cent.

7. Because of the increased output without corresponding increase in size, alcohol engines should sell for less per horse power than gasolene or kerosene engines of the same class.

8. The different designs of gasolene and kerosene engines are not equally well adapted to the burning of alcohol, though all may burn it with a fair degree of success.

9. Storage of alcohol and its use in engines is much less dangerous than that of gasolene.

10. The exhaust from an alcohol engine is less likely to be offensive, although there be some odour due to lubricating oil and imperfect combustion if the engine is not skilfully operated.

11. It requires no more skill to operate an alcohol engine than one intended for gasolene or kerosene.

12. There is no reason to suppose that the cost of repairs and lubrication will be any greater for an alcohol engine.

13. There seems to be no tendency for the interior of an alcohol engine to become sooty.

14. With proper manipulation there seems to be no undue corrosion of the interior due to the use of alcohol.

15. The fact that the exhaust from the alcohol engine is not as hot

as that from the gasolene and kerosene engines seems to indicate that there will be less danger from fire and less possibility of burning the lubricating oil. This is also borne out by the fact that the exhaust shows less smokiness.

16. In localities where there is a supply of cheap raw material for the manufacture of denatured alcohol, and which are remote from the source of supply of gasolene, alcohol may immediately compete with gasolene as a fuel for engines.

17. If, as time goes on, kerosene and its distillates become scarcer and dearer, the alcohol engine will become a stronger and stronger competitor, with a possibility that in time it may entirely supplant the kerosene and gasolene engines.

18. By reason of its greater safety and its adaptability to the work, alcohol should immediately supplant gasolene for use in boats.

Such is the American verdict where agricultural engines are concerned; and now let us turn to conclusions come to in England and Germany.

For years past, in both Germany and France, the importance of keeping the labour on the land and preventing overcrowding in the cities has led to the Governments of those countries doing all in their power to encourage the production of industrial alcohol, and in Germany especially State aid has not been spared to develop agriculture in this particular direction, and the value of alcohol as a fuel has been exhaustively tested and proved.

In two 8-h.p. engines at the last Vienna Exhibition, one designed for alcohol and the other for gasolene, the consumption was—

	Grammes per h.p. hour.
Alcohol	373.5
Gasolene	340

the efficiency calculated for the gasolene being only 16.5 per cent., whilst for the alcohol it was 28 per cent. Since then, other experiments have been made, and we may safely give the relative efficiency of the two as—

	Per cent. Efficiency.
Alcohol	32
Gasolene	22

which would give as the heat units converted into work calculated from the net calorific values—

	Calories.	British Thermal Units.
Alcohol	1,846	3,322
Gasolene	2,360	4,248

a result that very considerably reduces the difference between the two fuels; and as the highest efficiency is readily obtained with the alcohol whilst an ordinary gasolene motor rarely gives 18 per cent. in practice, the difference practically disappears.

Again, it must not be forgotten that the specific gravity of gasolene is .721 and of alcohol .820, a gallon of which will weigh 7.2 and 8.2 lbs. respectively, so that, taking the ratio of weight given by the Vienna experiment, the alcohol was volume for volume quite equal to the gasolene.

And now we are coming to a very interesting phase of alcohol use in motors.

The fact that it is possible to attain a much higher efficiency from alcohol is due to several factors, not the least of which is the greater ease with which complete combustion can be attained, and the smaller proportion of air needed as compared with gasolene; and also the fact that with alcohol far greater compression and a comparatively cool cycle is possible—conditions that are amongst the most important in fuel economy.

the cylinder and to ensure complete combustion is an important factor

The amount of air needed to form a properly explosive mixture in in the efficiency to be obtained, as the larger the proportion of the air that has to be used the greater will be the volume of exhaust gases which, being at a high temperature, means a considerable loss of power. Roughly speaking, about one-third as much air is needed for alcohol as for gasolene, one volume of alcohol vapour requiring 11 of air; and further, the limits of explosion with gasolene are from 2 to 5 per cent., whereas with alcohol it ranges from 4 to 13.6 per cent. The value of this extra range of exposure will appeal more readily to motorists.

Alcohol to be denatured for motor work is best mixed with benzine or some pyridine base, to avoid the formation of any corrosive compound. Such is done at present on the Continent.

The following is an epitome of a lecture given by V. B. Lewes:—

As a practical Colonist of long standing and a motorist this subject appeals to me in many ways. No one would be more pleased than myself to see this depression lifted and driven away, and I should be extra pleased if it were done by means of agriculture, in which I have always taken an intense interest. It does seem that at least a good step could be made towards this end by fostering the industry of alcohol production. We have not yet planted all the land available and suited to sugar cane growing. Let our Government by every means in its power get this land planted, and then by proper legislation make the sale of denatured spirit as easy as that of mealies or any farm produce, and offer bonuses for the introduction of the best class of motors and lamps to use this spirit, and so keep the money that now goes out of the Colony to buy kerosene, etc., in the pockets of the people

This suggestion should place £50,000 to be spent in the Colonies, would give the Government an opportunity of placing people on the land, make the Closer Settlement Association happy or perhaps unhappy at having nothing to grow about, and be the cause of stopping the sale of treacle to the natives to be made into *ishimiyana* (a villainous com-

pound that tends to degrade all who drink it), or the compounding of an inferior whisky. This it would surely do and a great deal more.

I know of a tract of land some thousands of acres in extent close to the mouth of the Illovo River where cane could be grown to perfection. This should be cut up into moderate-sized lots and sold to any who care to work it. A central mill could be run by the Government, a company, or a Board of the owners of the land. This land is at the present utterly waste and harbours a few lazy blacks. Personally I think everyone who grows sugar is a benefactor to the Colony, and that they should be encouraged in every way, and this suggestion would probably add 10 per cent. to their gains (and they deserve it). But it would at the same time do the other things I have enumerated, and this is where we all come in. We cannot afford to waste our bye-products if we are to compete with other countries.

My prognostication for the future is that, provided this idea is taken up, in less than a decade most of the work done will be by alcohol motors. The ideal motor will be air cooled, and the low calorific value of alcohol makes this most probable. This subject should be taken up by our Agricultural Union and all the Coast agricultural societies: and every Coast Member of Parliament should be interested and enlisted to give his support, for this is a measure where co-operation would give a greater certainty of success. If we found that proud moment ever arrived when we could not supply the demand, then we should have an extra reason for holding out our hand to our friends at Mauritius and combining with them to our mutual benefit. A joining hands of the motor and lamp maker and alcohol producer at first is an absolute necessity; but once fairly started, and its advantages seen, it will find no lack of either ready to supply a saleable article.

All chance of success depends on the attitude of the Government, and I hope for the sake of our people they will follow the good example set by France, Germany, and America.

In a further article the question of the use of alcohol in motors will be discussed.

RAILWAY RATES ON S.A. FIREWOOD, ETC.—It is announced that, on and after Monday, 1st July, 1907, a new scale of rates will be introduced for the conveyance of South African firewood, fencing posts, mine props, and undressed stone, between stations on the Natal Government Railways. Full particulars of these rates will be furnished on application to the General Manager of Railways, Maritzburg, or to the District Traffic Superintendents, Goods Agents, Stationmasters, and the Railway Offices, Durban.

Camels for Transport.

THEIR SUITABILITY FOR NATAL.

GERMAN S.W. AFRICAN AND RHODESIAN EXPERIENCE.

THE risks of losses from the devastating effects of such cattle plagues as East Coast Fever, and the consequent difficulties attendant upon transport, naturally turn men's minds to other forms of transport than oxen. Horses are out of the question for use to the extent they would be required in this country, and mules and donkeys are being tried. Whilst these have their advantages—and are a readily available substitute for oxen—their disadvantages are considerable, and it is a question whether this form of transport is ever likely to come into very general use in this country.

With a view to ascertaining whether the acclimatisation of camels in Natal could be effected, whether they would be suitable for this country, and what, on the whole, the prospects are of a successful introduction of this form of transport into Natal, inquiries were recently made of the Imperial German Consul at Durban relative to the use of dromedaries by the troops in German South West Africa. The Consul has very kindly furnished much valuable information, including various press cuttings, reports, etc., which have been translated by Mr. C. Meyerheim, of the Department of Agriculture. Mr. H. von P. Berensberg, of the Entomologist's Department, who had personal experience with the use of dromedaries as transport animals in Algeria, has also prepared an article and illustrations; and Mr. E. R. Sawyer has furnished a note dealing with Rhodesian experience. It is accordingly possible to present readers of the *Journal* with a large amount of information which will doubtless be of value in the event of the introduction of camels into this country, and will also give some idea as to what the prospects are for camel transport.

From the information which has been furnished by the Imperial German Consul, it appears that the use of dromedaries as transport animals in German South West Africa has met with very successful results. During the rebellion in that country dromedaries have practically only been used in the transport service, and only in a few instances for riding purposes. The animals were extensively used in those portions of the country where want of pasturage and water would have led to too great a loss in oxen and mules, and the results attained with the use of dromedaries are said to have been excellent. They were able to keep fit and in good working condition when only living on the

various thorn bushes which grow almost everywhere in the Province, and were also able to go some days without water—under conditions where other animals would have collapsed. Even in the rough mountainous parts they were used with splendid results.

The dromedaries were obtained from the Canaries and Somaliland (the latter through Messrs. Hagenbeck, of Hamburg). Delivered at Luederitzbucht the Canary camel cost 1,000 marks (about £50), and the Somali dromedary 1,500 marks (about £75). Those received from Somaliland are classified under three headings:—

(1) Animals of both sexes of the Habab and Raschaita breeds from the African Coast lands of the Red Sea:

(2) Animals of both sexes from the Arabian Inland;

(3) Stallions from the southern portion of the Red Sea—Danatzil and Aussa.

The Canary animals proved themselves the most satisfactory, and the least satisfactory were those mentioned under the 3rd classification—the light yellow stallions.

The average load of the Canary dromedary was from 3 to 3½ cwt., and they were able to cover from about 20 to 25 miles daily at a rate of 2½ to three miles an hour. The North African animals are weaker, their load averaging about ½ cwt. less. There were, of course, exceptions. The caravan leader had therefore to be very careful that each animal was loaded according to its carrying capacity. The feeding varied according to the nature of the pasturage in the different localities. In those portions where there was no pasturage, the animals received 4 to 5 kg. oats or maize and 10 kg. baled hay. In many districts of the Province they kept in splendid condition without any fodder of any sort being given them. As a general rule it was found that the best results were achieved by allowing each animal 4 kg. of fodder on "rest" days, but when trekking they lived entirely on the pasturage, thorn, etc.

The climate of South West Africa did not affect these animals in any way: their coats altered to meet the different conditions. They had, however, to be protected against colds and cold mists by means of coverings and tents. Diseases from colds, such as inflammation of the lungs, inflammation of the bowels, and rheumatism were not rare. No cases occurred of *surra*, as happened with the Somali dromedaries in the Cape Colony, nor was any evidence of its presence obtained even by the closest examination of the blood. The animals suffered chiefly from scab and saddle sores. The scab was introduced with the Somali animals, and it was a long time before it was eradicated. The saddle sores were brought about by the use of the Canary "bridge" saddle. The saddles made in Germany in accordance with the Abyssinian model proved lighter and better. Experiments in this direction have not yet been completed. Sore feet were never observed even in stony parts.

In German South West Africa the dromedaries are employed in **caravans** of up to 50 animals. The attendants generally necessary are a mounted caravan leader, one attendant for every five animals as driver; in addition to which men are employed at camps, stations, etc., for assisting in the loading and unloading.

From the results of the German South West African experiment, Messrs. Hagenbeck consider that, in spite of the difference in the climate and configuration of the two countries, the introduction and acclimatisation of dromedaries in Natal is more than possible. They are of opinion that their introduction would meet with successful results—provided, of course, that the right animals are selected and that they receive proper handling—and that, in comparison with horses, mules, and oxen, they would prove much more advantageous. The climate and configuration of the country in Natal, Messrs. Hagenbeck think, should prove no hindrance, judging from the experience gained in the German Colony.

The dromedary thrives in tropical East Africa up to the tenth degree of north latitude, not only in the plains but also on the hills; and it has been used with advantage in Abyssinia on roads of an elevation of 2,400 metres, and under severer conditions than would be met with in Natal both as regards rainfall and bad roads. The dromedary naturally shows its best qualities in the flat steppes and desert regions of Africa and Asia, but at the same time it is capable of working in a more than satisfactory manner in mountainous countries, providing, of course, that the proper breeds are selected. Though the dromedary may perhaps under certain conditions not be able to compete with the mule, yet it can always be used, Messrs. Hagenbeck state, under the same conditions as the ox. Both as a beast of burden and as a draught animal it has two important advantages over other animals used for similar purposes. The first is its capability of being able to go for long periods without water. The N.E. African dromedary, which was the one employed by the Germans in S.W. Africa, could go for a period of at least four days without water, and yet its working capacity was in no way affected. There are certain breeds which can work without water for as long as ten days, and this not only in winter but also in summer.

The second advantage is that it thrives on the scantiest of nourishment whilst its working power is in no way affected. The dromedary in its natural state grazes and thrives on the foliage and branches of the acacia and mimosa plants and other thorn bushes, and is able to feed in districts where oxen and horses are unable to exist owing to the want of grass for the best part of the year, and is able to thrive in districts where other animals would die of thirst and starvation.

Messrs. Hagenbeck recommend a trial, on a small scale in the first place, being made in Natal. They have a number of animals of the same

breed as those supplied to the German Government in South West Africa, between the ages of 6 and 12, and broken into every description of work. Twelve such animals could be supplied at the rate of £60 each, delivered f.o.b. Hamburg. At this price a complete pack-saddle would be included. The saddles in question are considered the best and most practical, and have proved themselves to be superior in every respect to all others that have been tried in German South West Africa. Sore backs are absolutely impossible, it is stated, where these saddles are used. Any animals supplied would all be males: female animals are very seldom employed for draught purposes, and are generally used only for breeding. Female dromedaries could, of course, be supplied for breeding if desired.

The Imperial German Consul has also supplied, with the other particulars, he has kindly furnished, a paper on the handling of dromedaries. The following is a summarised translation:—

Anyone who has charge of camels or dromedaries should banish any preconceived ideas that these animals are mere automata and that they are capable of carrying any loads for any distance for any number of days without food and drink. Dromedaries have to receive the same care and treatment as other animals, in spite of the fact that they are capable of standing more heat and thirst than any other animal. Such advantages have their limits, and if these limits are exceeded the animal breaks down. It is therefore necessary that animals should receive every care and attention with respect to feeding and drinking. Special care should be taken that drivers are not allowed in any way to ill-treat the animals. With proper care the dromedary can be used for 20 years or more.

Feeding.—Where there are sufficient quantities of mimosa and acacia, which form the natural food of the dromedary, as well as the leaves and twigs of other thorn bushes and grass, the animals do not require any other food, but care should be taken that those in charge see that the dromedaries are driven to the proper bushes. Where the proper grazing is not obtainable each dromedary should be allowed 20 lbs. of good hay a day, together with, at the most, 6 lbs. of mixed corn-fodder. At the commencement especially, when long marches are being undertaken, corn fodder should be given with care—and under no circumstances should barley be mixed with it. The best fodder consists of crushed or rolled oats mixed with crushed mealies or the African and Arabian *durra*. Each dromedary should have a teaspoonful of salt mixed with its fodder. This fodder should be given in the evening at the completion of the day's march. The first portion of the hay forage should be given in the early morning and the latter portion at night. Great care should be taken on the march that the animals are not allowed to eat any poisonous weeds.

Watering.—During the cool portion of the year the animals should be watered every second day towards midday. In the hot season the

animals should be watered every day before the march is commenced. The Somali dromedaries can go for a period of from 4 to 10 days without water. If the animals are, however, watered every day or every second day, it does not prejudice their power of doing without water. When dromedaries have been without water for 3 or 4 days while on the march, caution is necessary when they are watered: on such occasions they should not be allowed to drink just as much as they wish. Each dromedary should be allowed from one to two bucketsful. They should then be sent to graze for two hours, or, where grazing is not available, a small quantity of hay (not corn) should be given, after which they may be allowed to quench their thirst. The animals should never be allowed any corn as long as they have water in their stomachs. Unless these instructions are strictly adhered to the animal will be knocked up with colic.

On the March.—When feasible, the animals should be got ready for the march before sunrise, in order that they may be able to start right away at sunrise. A march should not exceed four hours at a time—representing 10 miles. The animals should then be allowed to graze until 3 o'clock in the afternoon, after which they can put in another four hours' march. When the night camp is reached the animals should be given the corn fodder, after which they should be allowed to graze for two hours. The dromedaries should then be camped near the luggage, etc., and a small supply of hay should be placed on a piece of sack or matting in front of each animal: unless the sack or matting is used, the animals are apt to swallow sand and stones, etc., which would have a bad effect on them. After every three to four days' march the animals should be allowed a rest. The principle of allowing the animals eight days' rest after every month's work is to be recommended.

As regards order of marching, the usual procedure is for the leading dromedary to be led and the following ones to be fastened to each others' tails. Such sets should not consist of more than six animals. Supervision is needed to see that each animal in a string is able to keep up with the leading one. The slowest and weakest animals should be placed in front, and the stronger and quicker ones placed at the end of the string. The attendant guiding the front animal should lead that animal with intelligence. Great care should be specially exercised in the case of night marches. Under no circumstances when the animals are loaded should anyone be allowed to mount them. When it is absolutely necessary for a sick or weak person to be mounted, then the load of the dromedary in question should be reduced by 140 to 150 lbs. It is always advisable on marches to have 10 per cent. of the animals as spare ones to act as reliefs, but these should be kept strictly for this purpose, and no one should be allowed to mount them.

There is another method than leading dromedaries in strings, and that is to drive them in herds, but this is only advisable in open country.

The loads should be made up into two equal lots, which are attached to each other by cords and affixed to the saddle in such a manner that the packages hang on either side of the animal's hump. Care is to be taken that the packages do not hang too low down. The sides of the dromedary should be protected with sacking or matting. In many cases it is a good principle to have the loads placed in large nets and slung on each side of the saddle. When loading up an animal it should be made to lie down between its two lots of luggage. Care should, of course, be taken that the luggage does not exceed the weight according to the carrying capacity of each animal. Once an animal has been loaded it should not be kept standing: if the march cannot be started at once the animal should be made to lie down until all the animals are ready. The best plan is not to allow the animal to rise when it has been loaded until everything is ready for the march.

The camping ground should be selected as far as possible free from stones. The dromedaries should be made to lie down in rows with their backs to the wind when camped for the night. Each animal should be provided with a waterproof covering, which on the march can be utilised to protect the packages.

Care should always be exercised to ensure the saddles being dry for use on the following day—the same attention being paid to dromedaries in every respect as to horses. Each dromedary should have its own particular saddle, the padding of which should where necessary be altered to fit its back. If constant attention is given to these details the animals will seldom suffer from sore backs. It is also important that dromedaries should be given the same grooming as horses.

Diseases.—As far as the digestive organs are concerned the dromedary suffers from the same complaints as other cattle. Colic is a frequent complaint where they have been allowed to over-eat themselves on fresh green pasture. The dromedary is also very subject to mange and scab, and for this reason careful grooming is necessary. On the first sign of mange or scab the animal should at once be treated with a mixture of creolin—the usual African preventatives, such as petroleum, should not be used. It is advisable that the animals should be regularly washed with a 2 per cent. mixture of creolin, as well as where possible being washed with water or sea water in the same manner as horses.

Riding Dromedaries.—A riding dromedary is treated in the same manner as the dromedary used for carrying or drawing loads, every care being given as to the fit of the saddle to prevent the animal being given a sore back. After a long ride the dromedary should be allowed an extra quantity of corn fodder. It should always be borne in mind that these animals have not the same instinct as horses or mules in finding their way back to camp, and consequently it is advisable that they should be hobbled when turned out to graze, and they should not be allowed to stray too far from camp.

Transport of Water.—For the transport of water, sacks made of sail-cloth are the best to use. The size of these should be about 36 by 20 inches. Four such sacks can be attached to each animal. The filled sacks should be placed in a netting and attached to the saddle.

Breeding.—Animals intended for breeding should be used for such purpose only and never worked.

In a report issued by the German Government on the use of dromedaries in German South West Africa, the following statement is given as showing the advantages of these animals as compared with other transport animals:—

A camel will carry 4 cwt. 25 miles without requiring any other food than the ordinary pasture.

A mule will carry $2\frac{1}{2}$ to 3 cwt. $14\frac{1}{2}$ miles; and, in addition to the ordinary pasture, will require 2 kg. of oats.

An ox will carry 3 cwt. $9\frac{1}{2}$ miles without requiring any other food beyond the ordinary pasture.

Further, the report goes on to say, the camel or dromedary is subject to far fewer complaints than other transport animals. It is practically immune to the ordinary cattle pests which are so prevalent in South Africa.

GENERAL DESCRIPTION OF THE CAMEL.

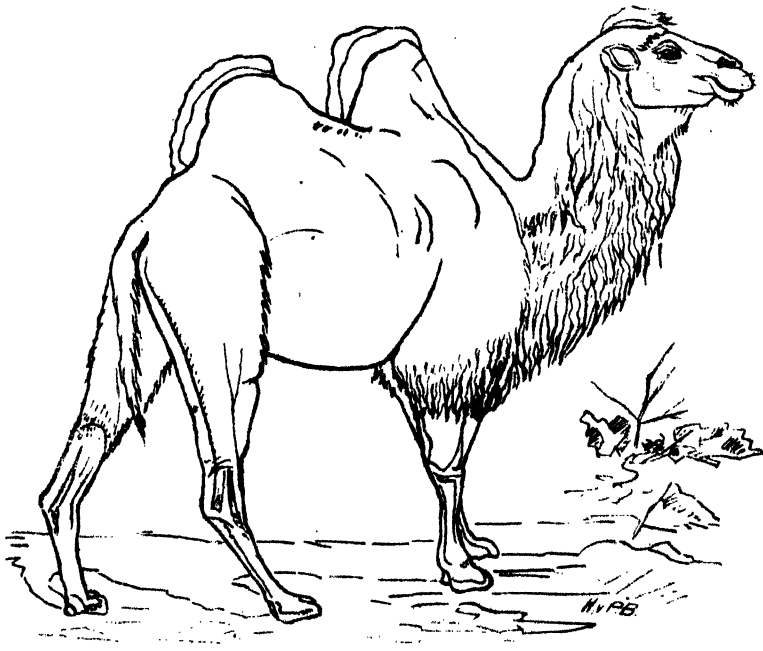
Mr. H. von P. Berensberg contributes the following interesting description of the camel—its natural history, habitat, habits, etc.:—

There are two distinct species of camels: the Arabian camel (*Camelus dromedarius*), and the Bactrian camel (*Camelus bactrianus*). The latter is only found in Central Asia, and is easily distinguished from the former by its double hump, its inferior height, stouter build, and shorter legs, and by its longer and denser hair. This animal being quite unlikely to be successful if introduced into hotter climates, the Arabian camel remains the only one to be discussed here.

The Arabian camel or dromedary is found both in Africa and in Southern Asia. It is a long-legged animal with one hump, a coat of comparatively short hair, soft feet—broad, expanding, cushion-like pads specially adapted for walking on yielding sands. Its height is from about 6 feet 8 inches to 7 feet. It is an ugly looking animal, the head is rather short, with convex forehead and sloping muzzle, the eyes are large, with a soft, stupid expression, and the ears small and placed far back. The divided upper lip overhangs the lower: the nostrils are large and slit-like, and can be closed at will. The neck is very long, laterally compressed and thickest in the middle. The back rises from the joint of the neck to the loins, and then falls away abruptly to the root of the tail. On the back is a hump, an accumulation of fat, which stands upright when the animal is in good condition, but hangs off or even sometimes nearly disappears in a half-starved beast. The hump

should form a regular pyramid, and is then a sign of health. The hair is soft and short except on the hinder part of the head, neck and throat, shoulders, hump and upper part of the forelegs. The general colour is sandy grey, but there are white, greyish-brown, and even totally black camels; the latter are considered worthless by the Arabs.

Several distinct breeds are recognised, but, generally speaking, they may be divided into baggage camels and riding camels or dromedaries. Camel-riding is not a pleasant exercise, but rather "back-breaking," because the animal's method of locomotion is to move both legs on one side simultaneously. A fully loaded camel can make from $2\frac{1}{2}$ to 3 miles an



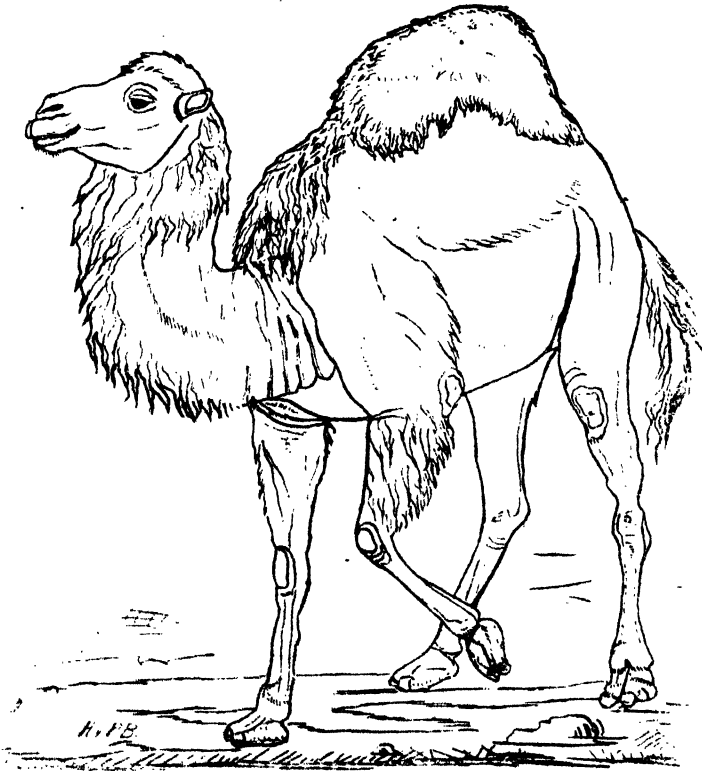
BACTRIAN CAMEL.

hour, whereas a riding camel or dromedary will travel as many as ten miles in the same time, and will keep up this pace for a long period. There is a special breed of dromedary called the "Mahari," which is considered of much more value than the best Arabian horse.

At present camels are not found in the wild state, but only domesticated. Occasionally some are found wild; these are descendants of tame ones which have escaped the dominion of man. Camels as animals of burden have been known from the remotest ages. Arabia may be taken as their original home.

The Arabs have a legend about the origin of the camel. In ancient times, when animals were said to be able to speak, the horse one day

complained of its appearance, and said that the Creator had not given it as fair a share of beauty and usefulness as the other animals. It was dissatisfied with its head and its ears, which were too long, with its neck which was too short, and which it thought would look nicer if it were graciously curved like that of the swan. The length of the legs could be improved to impart a greater rapidity of locomotion, and last but not least, why should the saddle which its master had to put on and take



ARABIAN CAMEL.

off every time not be a part of its body and be inseparable from it? The Creator, who overheard this grumbling, made an animal as depicted by the horse, and the result was the camel with its ugly appearance. The horse, however, became terrified and did not insist on having its own shape altered. The Creator allowed the new animal to exist as an eternal warning to the horse. The Arabs thus account for the fright most horses show when they see a camel for the first time.

The camel lives in dry arid countries and deserts, and is able to exist for a long time without food and water. Its principal food consists

of branches and leaves of trees, and it will not reject thorny boughs, which will do no harm to its mouth. It will do well on such a diet or on a few dates, but when required to do work for some days it will soon break down. Grain should be largely given then, but a certain amount of green food is absolutely necessary to the animal's health. Its capability of remaining several days without water is very great, but must not be overtaxed. When drinking it takes a considerable quantity of water, which is stored away in cells in the walls of its stomach. Although the camel is perhaps the ugliest creature known, its value as an animal of burden is without parallel, and without it great tracts of land in Northern Africa would be uninhabitable. Besides its use as a carrier of baggage and a riding animal, the Arabs eat its flesh, which is very palatable, the writer himself having eaten it several times in his travels in the south of Algeria. Its milk is very thick and rich, but unserviceable in coffee and tea, as it curdles immediately. Its hair is woven into strong ropes and cloth, principally used for tents. The dam brings forth one calf after a gestation of rather more than eleven months.

Camels are said to have a very bad temper, and will frequently bite when passing one another, but they are easily handled, and when once started on a track they will continue without any more trouble and do so for hours. The general disposition of the camel is rather stupid, and it will never become attached to its master, but its many shortcomings are counterbalanced tenfold by its unsurpassable value as an animal of burden. Camels have a great aversion to crossing even the smallest stream, and swim either imperfectly, or not at all, without assistance.

As to whether the introduction of camels into Natal will be advantageous or otherwise, there are many points for and some against their use, which must be considered. In favour of their use may be noted the following points:—

1. The camel is not subject to cattle diseases, such as East Coast Fever, Gallsickness, Lungsickness, etc.; this alone would be sufficient to warrant its introduction. Transport arrangements will therefore not continue to suffer, there will be no more quarantine areas, and the farmer will be able to bring his farm products to the market.

2. It is immune from Horsesickness and the bite of the tsetse fly. Here again the camel will prove of great value in replacing horses and mules in districts where, as in some parts of Zululand, horses and cattle cannot be kept because the tsetse fly is present. At the same time the big game can be preserved, and it will not become a necessity to destroy all the beautiful antelopes, which, as is generally accepted, are the indirect cause of the presence of the tsetse.

3. As has been proved by experiments in German South West Africa, the camel carries heavier loads and to greater distances than the ox and the mule.

4. It requires for the greater amount of labour no more food than the ox and less than the mule. In addition, it will accept food which an ox will not, feeding and thriving on thorny bushes.

5. It is able to remain for a long time without water. This quality will be appreciated in districts where water is scarce and sometimes unobtainable.

6. A camel can be put to work from its fifth year and will continue working until its twenty-fifth year or longer. Thus the time that it can be employed as a beast of burden exceeds considerably the life of an ox.

The points against the use of camels in Natal may now be considered:—

The first and, considering the depression through which Natal farmers are passing just now, perhaps the greatest drawback is the initial expense which, as a matter of course, is not light. The price of a camel would amount to about £60, plus the sea freight from Hamburg to Durban. Thus the capital to be invested in the purchase of a sufficient number of animals would be considerable. Therefore it would be advisable to make a small experiment at first, perhaps with a dozen specially selected animals, before venturing in such a big enterprise.

2. The camel is further a bad-tempered animal or, rather, a very stupid one, but it is just this stupidity that makes it so easy to handle. If once started on a track, it will continue thereon for many hours without stopping.

3. It has a great aversion to crossing water, but this refers rather to water where it has to swim. Very likely the camel cannot swim at all, but some travellers say that it will swim, if the head is kept up to prevent the animal from drowning.

The first of the arguments against the introduction of camels will lose much of its force when we consider the fact that the higher price is compensated by a greater length of service, and the high profits of breeding. The two succeeding points are not important enough as to merit much consideration. Every farmer has some bad-tempered oxen or mules, and in time they become accustomed to work. In the report of the Government of German South-West Africa no mention is made of these two last points, which were recorded here in order to furnish a true picture of the animal.

CAMELS IN RHODESIA.

During the last three or four years camels have been introduced into Rhodesia for transport purposes, but the results, it is stated, have not been altogether encouraging. Mr. E. R. Sawyer, Director of Experiment Stations, has furnished the following note dealing with Rhodesian experience:—

The Rhodesian Administration decided in 1904, at a time when

transport animals were urgently required to take the place of oxen driven from the roads by East Coast Fever, to secure from India a limited number of riding and baggage camels with a view to determining their utility in, and adaptability to, local conditions. Colonel Flint late Commandant B.S.A.P., who had strongly recommended their use, was commissioned to proceed to India and make personal selection of beasts of suitable type, and some thirty head in all were landed without loss at Beira and trucked to Salisbury. An Indian veterinary surgeon and native attendants accompanied the camels to ensure suitable management and feeding, and a large supply of Indian medicinal plants was imported for the treatment of cases of sickness. On recovery from the effects of the journey they were put to work under packs and harnessed to wagons, while the riding camels were served out as police mounts. Very satisfactory results were secured during the dry season, and it was found that as much as 600 lbs. of grain could be loaded upon a full-grown male, while females would carry 500 lbs. Six camels harnessed to a wagon would draw a load of 4,000 lbs., and no troop horse could live with the better riding mounts after the first day's trek. An early difficulty was experienced in the rearing of calves, which were extremely delicate and very subject to rickets. Bone formation was uniformly deficient on the sand-veld, a result probably due to the demonstrated shortage of phosphate in the soil. An outbreak of foot-and-mouth disease occurred at the Goromanzi Police Camp, which was, however, stamped out by the slaughter of infected animals. With the advent of the wet season it was further seen that the animals were quite unsuited to work on muddy or slipperv roads, the formation of the foot and pad being peculiarly adapted to loose and dry sands, and not lending itself to wet clays or rocky ground. A limited number of these camels were subsequently distributed by private sale to farmers and transport-riders at a price of £60 per head, and the remainder were withdrawn from police service and transferred upon terms to Colonel Flint. The latter animals are now running in the Victoria District, Southern Rhodesia, and a report of recent progress has been requested from this gentleman.

A cow owned by James Jenson in Center township, Marysville, Kan., recently gave birth to six calves in one litter. None of the calves lived. This same cow gave birth to three calves a year ago, and the same number two years ago. Three years ago this cow gave birth to twins, both of which lived. Only one calf from each of the litters of three lived any length of time.

Vlei Soils.

By ALEX. PARDY, F.C.S., Analyst.

WE have distributed throughout Natal in larger or smaller areas a class of soil which has been set down and otherwise influenced by aquatic agencies. These vlei soils, when taken as a whole, must represent an extent of arable land of no mean importance; and were we capable of utilising them to their utmost there is reason to believe that they would become the coveted spots of our farms.

They are low-lying, more or less flat tracts of land, consisting, in their upper layers, of soils carried down from the country included in the catchment area of their streams; and it is to the nature of the land lying above and around them that their characters are due rather than to their underlying rocks: thus they are more mixed and less local in type than the hill soils.

These soils, if well managed, seem to be capable of high production: and as they lend themselves, owing to their level or slightly inclined surfaces, to easy cultivation and irrigation, they become deserving of special attention in regard to their characters and susceptibilities.

The Director of Experiment Stations (Mr. Sawyer), in recognition of the possibilities of such soils, has instituted a series of operations which have for their object the practical demonstration, under varying conditions of drainage and irrigation, of their capabilities and producing qualities, and also of their possibilities of improvement as indicated by the various methods of treatment. At his instigation a series of experiments has been conducted in the Laboratory in conjunction with the field work, in order to ascertain something of the nature of these soils both in regard to their mechanical condition and their contents of soluble constituents.

In order to carry out the work in a more or less comprehensive manner, samples of soil were obtained from localities exhibiting variations in the subsoils, and these were taken to a depth of three feet, each foot downwards being placed separately. Nine samples were obtained in this way from the Central Experiment Farm, together with one surface sample of a washed soil, and one each of the surface and subsoils of a typical vlei soil. Four samples, representing two surface and two subsoils, were also obtained from the Irrigation Settlement at Weenen, making in all sixteen samples.

As these soils, owing to their disposition and relative position with regard to stagnant or semi-stagnant water, become more or less impregnated with saline matter carried down in solution from the soils

above, they are, in their natural undrained condition, liable to accumulate such salts, more especially in the surface regions, where they become concentrated owing to the extensive evaporation that takes place in contact with the atmosphere. In order to ascertain how far this was the case portions of the various soils were treated with distilled water in such a way that the soluble salts were dissolved out, collected and measured. The plan fulfilled the double purpose of showing the effects of irrigation combined with free drainage, as well as giving the proportion of saline matter referred to.

An imitation of the natural conditions occurring in the soil was attempted by weighing out a quantity of soil which, when introduced into the glass tubes, just stood one foot in height; thus the water was compelled to percolate through one foot of soil of which the sample was a representative. Water equal to five times the weight of the soil was passed through each column collected and measured previous to the estimation of the dissolved matter.

The total solids in the water extract calculated to the percentage of soil were found to be as follows:—

TOTAL SOLIDS.

Sample.				1st Foot.	2nd Foot.	3rd Foot.
No. 1	...	...	...	0.070	0.035	0.028
No. 2	...	...	...	0.093	0.045	0.033
No. 3	...	...	...	0.035	0.028	0.030
No. 4	...	...	...	0.035	...	...
No. 5	...	...	...	0.040	0.029	...
No. 6	...	...	...	0.053	0.048	...
No. 7	...	...	...	0.042	0.034	...

These figures show something of a gradation from the surface downwards in the contents of saline matter, which points to the influence of capillary action accompanied by a concentration on the surface due to evaporation of the water of solution. In arid climates these soluble salts are liable to accumulate in detrimental quantities on the surface, and to render the growth of vegetation impossible. In rainy climates much of the soluble constituents are washed out through the soil and carried away, but the extent to which this occurs depends very much on the nature of the soil, its state of natural drainage, and ability to store water.

Very little of the soluble matter obtained was found to be of value to the plant: at the most only a trace of phosphoric acid was obtainable from the filtrate, a minute quantity of potash and smaller quantities of lime and magnesia. Sodium as carbonate, chloride and sulphate predominated in the majority of cases. It is to sodium in some of its combinations that the bad effects of the saline accumulation are largely due.

BASES IN SOLUTION.

Sample.	Base.	1st Foot.	2nd Foot.	3rd Foot.
No. 1 ...	Potash ...	0.003	0.004	0.003
	Sodium ...	0.020	0.006	0.006
	Lime ...	0.004	0.001	0.001
	Magnesia ...	Trace	0.002	0.001
No. 2 ...	Potash ...	0.008	0.007	0.005
	Sodium ...	0.040	0.009	0.005
	Lime ...	0.007	0.004	0.001
	Magnesia ...	0.003	Trace	0.002
No. 3 ...	Potash ...	0.001	0.004	0.004
	Sodium ...	0.012	0.006	0.005
	Lime ...	Trace	Trace	0.001
	Magnesia ...	0.003	0.003	0.002
No. 4 ...	Potash ...	0.006	...	...
	Sodium ...	0.004	...	...
	Lime ...	0.001	...	...
	Magnesia ...	0.005	...	...
No. 5 ...	Potash ...	0.004	0.006	...
	Sodium ...	0.014	0.004	...
	Lime ...	0.002	Trace	...
	Magnesia ...	0.003	0.003	...
No. 6 ...	Potash ...	0.006	0.005	...
	Sodium ...	0.018	0.014	...
	Lime ...	0.005	0.001	...
	Magnesia ...	0.001	Trace	...
No. 7 ...	Potash ...	0.005	0.008	...
	Sodium ...	0.014	0.020	...
	Lime ...	0.006	Trace	...
	Magnesia ...	0.001	Trace	...

RABIES: IMPORTATION OF CARNIVORA.—Owing to the existence of rabies amongst dogs in German South-West Africa, the importation into Natal from that country and the Portuguese Territory of all dogs and other carnivora and also monkeys has been prohibited by Proclamation appearing in the *Natal Government Gazette*.

Agriculture in Ireland.

THE STATISTICS FOR 1906.

THE Department of Agriculture and Technical Instruction for Ireland has just issued its annual report on the agricultural statistics of Ireland, 1906 being the year reviewed. The total area of land under crops was 4,728,244 acres—an increase of 72,017 acres over that of the previous year. An increase of a little over 19.6 per cent. is recorded in the acreage under flax. The area under cereals was 3 per cent. greater in 1906 than in the previous year, and in that under hay the increase was 1.6 per cent.; whilst on the other hand there was a decrease of 1 per cent. in the area under “green crops” (not including flax).

The area under potatoes amounted to 616,107 acres, a decrease of 648 acres as compared with the previous year. Since 1880 an annual return has been made of the acreage of each variety of potatoes grown in Ireland. From the return for 1906 it is noticed that “Champions” monopolise 56 per cent. of the total acreage under potatoes. “Up-to-date” come next, with 14.5 per cent., followed by “Beauty of Bute” (6.6 per cent.), “Flounders” (5.2 per cent.), “Sutton’s” or “Sutton’s Abundance” (4.5 per cent.), “Black Skerries” and “Skerry Blues” (4.2 per cent.), “Irish Whites” (2.9 per cent.), and “British Queens” (2.2 per cent.). The total acreage of all other varieties only amounts to 3.9 per cent. of the total area under potatoes. Since 1880, it is stated, the “Champion” has constituted the main crop of the country, although since 1891 the proportion under “Champions” has declined from 79.7 per cent. to 56.0 per cent. (in 1906).

The total produce of potatoes was 2,660,581 tons, being 22.3 per cent. less than the yield in 1905. The turnip crop was 4.9 per cent. greater than that of 1905; the total quantity of mangel wurzel and beetroot produced was 4.9 per cent. more; and the yield of flax (12,024 tons) was 10.6 per cent. over that of 1905, and 26.6 per cent. over the average for the ten years 1896-1905. The average yield per acre of potatoes was 5.55 tons, equivalent to 82.9 muids, in Natal measure. It may be of interest to note that the average yield of potatoes in Natal in 1905 was 33.8 muids, and in 1906 under 30 muids.

There was a slight decrease in the total number of cattle in 1906 as compared with the previous year, and there were also decreases in the numbers of sheep and goats. Increases are recorded in the numbers of poultry and pigs.

Locust Destruction.

INTER-COLONIAL CONFERENCE.

IN connection with the first meeting of the Inter-Colonial Locust Bureau, the committee of which is composed of official representatives of the British Colonies of South Africa, at the suggestion of the High Commissioner representatives of Ministerial rank also attended, and the German and Portuguese authorities were also invited to send delegates.

The session commenced upon the morning of the 17th May, at the Palace of Justice, Pretoria. The various States and Colonies were represented by the following delegates:—

German South-West Africa: Herr Francke (German Consul-General).

Mozambique: H.E. Lieut. Graca (Military Governor of Gazaland).

Cape Colony: The Hon. A. J. Fuller (Minister of Agriculture) and Mr. Greene.

Natal: The Hon. W. A. Deane (Minister of Agriculture), Mr. Claude Fuller (Government Entomologist), and Mr. A. G. Kelly (Assistant Entomologist).

Transvaal: General Smuts (Acting Prime Minister), Mr. F. B. Smith (Director of Agriculture), and Mr. C. W. Howard (Government Entomologist).

Orange River Colony: Mr. Barclay Lloyd (Acting Attorney-General), Mr. Johnstone (Chief Locust Officer), and Mr. Neethling (Government Entomologist).

Basutoland: Mr. Wroughton (Government Secretary).

Bechuanaland Protectorate: Mr. Barry May (Government Secretary).

The proceedings were opened by Lord Selborne, who said:—"I have the honour on behalf of the Transvaal Government to offer a cordial welcome to the representatives of every Government in South Africa, who are led to take part in this most important Locust Conference. I think the representatives of the Cape Colony and Natal will permit me to go even further on their behalf, as well as on behalf of the Transvaal and Orange River Colony and other portions of South Africa, to express our pleasure that we are honoured to-day with the presence of your Excellency the Military Governor of Gazaland, representing the Portuguese Administration, and you, sir, the Imperial German Consul representing German South-West Africa. All the Governments are here represented to take joint action in this matter, which is so vital to the farmers of South Africa. Last year I had the honour of welcoming the delegates to a similar Conference, but much has happened since then; much I mean in connection with this important subject, which you have met to consider. In the first place I would like to allude to the death of Mr. Simpson, the Transvaal expert. Mr. Simpson was a

young American of great promise, who had given the Transvaal the very best results of his scientific training in America, and I think all who knew him—and those who did not know him personally, but have seen something of his work—must deeply deplore his untimely end. I think South Africa for many a long day will owe much to his unselfish and skilled exertions. He certainly gave his best to the land in which he was employed, and if any one man gave a greater impulsion than another to the attempt now being made to deal with this universal plague I believe that man was Mr. Simpson. (Hear, hear.)

“In the second place we have been afflicted by an almost unprecedented plague of locusts. I believe the memory of the oldest inhabitant does not carry him back to a plague greater than the one which at any rate the Transvaal and the Orange River Colony, and, I believe, certain parts of the Cape Colony, have suffered from, but I would ask you to consider how much worse that plague would have been if the work that followed as the result of the last Conference had not taken place. The number of swarms destroyed as the result of that Conference has been enormous, and vast as has been the damage done by the plague of locusts I think we may safely say that the damage would have been far greater if it had not been for the work of locust destruction actually carried on. Therefore to the farmers of South Africa there has been a saving in money value not easy to calculate as a direct result of the conference which took place last year.

“In the third place, in these few short months since the last Conference, we have gained some very valuable experience. We have learned, I think, by universal consent that the best way to kill the locust is to kill him in the voetganger stage. We have also learned how to kill him and where to kill him. Very often, when discussing this question with farmers in South Africa, it has been said to me, and no doubt to many of you gentlemen also, ‘What is the use of our killing the locusts in the Transvaal or in Cape Colony, or wherever they may be, when we know they will come in from the Kalahari desert in even greater numbers? How can you organise the destruction of locusts in the Kalahari desert?’ Well, gentlemen, if we have rightly learned the life cycle of the desert locust, we know now that we have no need to pursue him into the Kalahari desert.”

Lord Selborne then read paragraphs from the last report on locust destruction in the current season, in which it is stated that there are two generations of locusts in South Africa. The first generation hatches from eggs which have been laid in that portion of the Kalahari desert which is included in British Bechuanaland, Gordinia, Griqualand West, Kenhardt, and Prieska districts of the Cape Colony and including all the central portion of the Cape Colony from the Great Fish River eastwards to Middleburg and almost as far south as Oudtshoorn. The eggs are laid here early in January, hatched at once, and the voetgangers are

fully grown early in March, when they at once proceed south-east, east and north-east, invading eventually nearly the whole of the east of Cape Colony, Basutoland, Orange River Colony, Transvaal, most of Southern Rhodesia, and parts of the Bechuanaland Protectorate (these swarms arising from eggs laid in the Kalahari desert). They then invade the most civilised and completely settled portions of South Africa, and here they stay from June to August, when they lay their eggs, which hatch with the first rains of the season and become winged by December. They then fly down to the Kalahari, where they lay their eggs and the life cycle begins over again. "This information," the report continues, "shows us that our success in combatting this pest depends upon the co-operation of all the South African Colonies and territories. If each Colony will destroy its own voetgangers between October and December, there will be no locusts to go into the Kalahari in January, and no locusts to invade us in March. If, on the other hand, only one or two of the Colonies destroy their voetgangers there would be still plenty bred in the Kalahari, and those Colonies who were working have to suffer invasion each year merely as a result of their neighbours' negligence."

Proceeding, Lord Selborne said:—"So the egg that is laid in the Kalahari is laid by a locust, so far as we can understand, that has been hatched in the Transvaal or in the O.R.C. or Cape Colony, and if we can destroy them here in the middle of civilisation you will have no work in the Kalahari because they will lay no eggs there, and we shall not get the swarms coming back to us from those distant regions. That proves to be a most important contribution to our knowledge of the creature.

"This information shows us that all our success in combatting the pest depends upon the co-operation of all the South African Colonies and territories, and if each Colony will destroy its own voetgangers between October and December there will be no locusts to come back to invade us in March. That seems to me to be the whole thing in a nutshell.* On the other hand, if only one or two Colonies destroy their voetgangers there will be plenty in the Kalahari and the other Colonies will suffer as the result of their negligence. Now, gentlemen, consider the terrible nature of this evil. I do venture to say that I think we are bound to make the greatest effort possible to cope with it. It is the excuse given, as I was reminded here the other day, by the lazy farmer for his laziness, who says 'What is the use of my working when all the results of my toil are going to be destroyed by the locusts?' But what is far more important is the ruin of the industrious farmer. I cannot think of anything more heartrending than the fate of the man who has put in his mealies by the sweat of his brow and the acquired knowledge and experience of half a lifetime; and the voetgangers come and take

* The reader is reminded that throughout the speech Lord Selborne is referring only to the brown locusts, and the statements made must not be taken as applying to the locust question in Natal.

them all. He replants undaunted, his crop grows up, he has abundant rains, there is every promise of a fine crop, as has happened in district after district in the Transvaal this year; and just as he is going to reap the fruit of his labour fresh swarms of locusts come in and sweep away or ruin his crop. That has happened on farm after farm in the Transvaal and O.R.C. this year. I can think of nothing that any Government can do more beneficial or more really and truly calculated to assist the progress of South Africa than if they can remove this crushing load of anxiety from the mind of the farmer. He cannot do it by himself. He himself can assist the Government, and he ought to be made to assist the Government, but in this matter the Government must take the initiative, and, unless all the Governments join together to support each other the efforts of no individual farmer or Government will be sufficient to cope with it. Indeed, I go so far as to say we shall be guilty of criminal neglect if we do not one and all endeavour to grapple with this problem. Try to imagine the position of a farmer who has been placed as I have pictured to you. How destructive of progress, how destructive of energy, how cruel, and I believe I may go so far as to say, how unjust it is, when we can by combined effort remove this clog upon the progress of the industrious and progressive farmer. Gentlemen, I think all the evidence is to the effect that public opinion is behind the Governments of South Africa in this matter. There are questions on which we well know Governments cannot go in advance of public opinion, but on this question public opinion has shown a great advance of recent months. There have been demands from farmers' societies for compulsory legislation on this subject, and there are very few now who maintain that it is not a function of the Government or that it would be wrong of the Government to interfere. Therefore, I say that this Conference, so ably represented not only by the expert delegates, but by the responsible Ministers of the different Governments, is a happy augury of what can be done by combined South Africa, and I am sure I am only voicing the opinion of the whole of British South Africa when I say how very cordially we welcome the co-operation of the Portuguese and German administrations. (Applause.)

Lord Selborne then left the Conference, and, upon the motion of the Hon. A. J. Fuller, seconded by the Hon. W. A. Deane, General Smuts was voted to the chair.

Mr. Howard then read a report upon the work by the Bureau up to date.

Mr. Fuller (Natal), speaking to the agenda tabled, pointed out that the subjects set down for discussion were such as only concerned the members of the Bureau, and expressed the opinion that the Ministers and State officials present might like to give the Conference some statement upon the question of locust destruction in their respective Colonies and countries.

TRANSVAAL.

General Smuts then addressed the meeting. He said they had an enormous number of swarms of locusts, greater than in the memory of living man, concentrated in the Transvaal, Orange River Colony, Cape Colony, and other parts of South Africa. If these Colonies co-operated to the best of their ability in destroying these swarms which now covered the face of the earth, the result would be that they would practically break the back of the locust plague, and South Africa would be rid of the scourge, which in a way was really a far greater scourge than either rinderpest or tick-fever, or any of the other diseases, because the effects of these diseases were not so dreadful and so far-reaching as those of these swarms of locusts. The enemy had been delivered into their hands, and if they were energetic this year he would not be surprised if they got the better of the locusts. The Transvaal, he was certain, would do its utmost; and, from what he had seen, he knew that other parts of South Africa would also do their best. He thought it must be recognised that South Africa would be wrong if it did not cope with this difficulty and do its best to get rid of it. He was extremely anxious that their friends, especially in the Cape Colony, should help. He understood that locusts were laying eggs all round the borders in Cape Colony. It was of no use their attempting to destroy all their swarms if their friends over the border did not help. They in the Transvaal wished to impress upon them the gravity of the situation and the extreme desirability of their doing their best to co-operate with them. He was glad to see delegates there from the neighbouring Colonies, and he would be glad to have some assurance from them.

CAPE COLONY.

The Hon. A. J. Fuller (Cape Colony) said a difficulty in the past had been to get the whole of the Cape Colony to co-operate with them in the matter of locust destruction. He recognised that it was perfectly hopeless for one section of the community to try to deal with the question unless the others were prepared to throw in their lot. He was in earnest over the matter, or he would not have travelled eight or nine hundred miles to attend that Conference. His Colony was going to put its hand to the plough: it was going to make every effort, in conjunction with the other Colonies, to do what it could, at any rate, to minimise the evils of the pest. They did not propose to deal with the locusts in the Kalahari, because it was impossible to deal with them there; but once they had come from the Kalahari in the voetganger stage, it must be the duty of every Government to make the best effort possible to destroy them whilst in that stage. It had been done, it could be done, and it must be done. He could assure them that the Cape Government were determined to assist in the efforts that were about to be made in the destruction of this pest. (Applause.)

NATAL.

The Hon. W. A. Deane said he thought Natal could claim to have set the example regarding locust destruction to the rest of South Africa. They regarded locust destruction as an insurance premium. They had experimented in the past upon the various methods of destruction, and they had proved the value of their methods of spraying with arsenite of soda and of the locust fungus, and he thought that other States would do well to follow Natal's example in this respect. The past season had been very bad. The probable mealie crop would be about a million muids. He was convinced that, had they not spent over £6,000 on locust destruction, their mealie yield would never have been half that amount. That went to prove that this locust destruction was the very best insurance premium possible. He knew the adjoining States were not favoured to the extent that Natal was with regard to rainfall and well-watered country; but Natal had its disadvantages in the form of a huge native territory—and he might say that the method they adopted was for the Government to step in and at its own cost destroy all the locusts in those native territories. They had a Locust Act which enabled the Government to force occupiers of land to kill their own locusts. As had been said, it was no use one Colony killing its locusts if there was no concerted action in the adjoining States. He was very pleased to be present at that Conference and to see the Portuguese Governor there, for he hoped that, by his (the Governor's) presence there, the Portuguese Government was prepared to go into this matter of locust destruction. They found that, although they might kill their own locusts, they had invasions from that portion of South Africa. He thought the words of the High Commissioner were very true when he said that the people are behind the Governments. He hoped that the Conference would be so fruitful in the future as to make the lot of the agriculturist bright and more prosperous.

ORANGE RIVER COLONY.

Mr. Barclay Lloyd (Orange River Colony) said that, in the Orange River Colony, the farmers had come forward and had not only asked the Government to destroy the locusts, but had asked for legislation to compel the farmers of the country to destroy the locusts on their farms. Legislation had been drafted on the lines on which Natal had worked with such great success. They had spent during the last season upwards of £12,000 in coping with the enormous swarms of locusts which had come across the land. He would gladly give the assurance of his Colony that they were going to tackle the locusts in the way which the experience of the other Colonies had taught them to be the right and only way of dealing with them. Now was the time for action; and he thought if they all entered on the matter in the spirit with which the O.R.C. farmers entered into it, they would be able to exterminate the immediate danger which hung over their heads.

GERMAN SOUTH-WEST AFRICA.

Herr Francke (German Consul-General) wished to assure them that he would do all in his power to assist in the work. At present he was not able to tell them what measures had been taken in German South-West Africa. He was afraid they had not made any great progress owing to the trouble they had had during the last few years, but he could assure them of the interest of his Government in such an important question, and he would do his best in submitting the decisions which were arrived at to his Government and obtaining its assistance in this matter to the best of its power.

BASUTOLAND.

Mr. Wroughton (Government Secretary) said that the question of legislation for the destruction of locusts hardly affected his district, as they had a purely native population to deal with under the tribal system. They had spent during the year a little under £2,000, which did not quite represent the work that had been done, because, working through the chiefs, they had a large amount of free labour from natives who were told off by their chiefs to assist. He was directed by the Resident Commissioner to say that, although they could not promise legislation as other Colonies proposed undertaking, every assistance would be given according to the means in their power.

BECHUANALAND PROTECTORATE.

Mr. Barry May (Bechuanaland) said they had an enormous territory, in extent very nearly equal to that of Cape Colony. To administer that territory they only had a handful of officials and a very small police force, with a small revenue and a fairly big expenditure. Still, his Government was prepared to make an effort to destroy the locusts. They proposed to use the method which had been most satisfactory in Natal and also in the Transvaal—the arsenite of soda method.

PORTUGUESE TERRITORY.

Mr. de Wagenaere (Portuguese Vice-Consul at Pretoria), speaking on behalf of the Portuguese representative, said that the Portuguese Government was certainly prepared to co-operate with all the other States of South Africa, and a sum of money was to be set apart for the destruction of locusts.

RHODESIA.

The Chairman was sorry that Rhodesia was not represented, which, he understood, was due to the sitting of the Legislative Council of Rhodesia, which made it very inconvenient for that Administration to be represented.

The members of the Central Bureau then sat in committee to consider the agenda, with a view to submitting proposals to the representatives of the various Governments at a later stage.

THE PRESENT POSITION.

At the afternoon sitting of the Conference Mr. F. B. Smith (Transvaal) said that the representatives of the various Colonies had been comparing notes, and from those notes and information available everything went to show that it was possible to destroy locusts in the early stages, and that this had been done with great effect in several Colonies, and also that an immense amount of crops had been saved by the action of the Governments in so doing. It was also found that enormous losses had occurred to certain Colonies through the invasion of flying swarms of locusts from other Colonies. In taking stock of the preparations which the various Governments had already made for conducting a locust campaign next season, it had been found that Cape Colony last year had set aside the sum of £500 for the campaign, but that they did not expend the whole of this amount. They had issued spray pumps, some 500 in number, to farmers, and also a large quantity of arsenite of soda free. Natal, during the last four years, had spent on an average £5,000 yearly on locust destruction, and last year they had spent £6,000. This money had been expended chiefly in the native territories, because the farmers themselves fought the locusts, and had had to conduct the destruction on their farms themselves. Natal had ordered for next year 30 tons of arsenite of soda, and had a considerable stock in hand, in addition. The Orange River Colony had spent £12,000 on their locust campaign. For the coming year they had ordered 5,000 spray pumps and 40 tons of arsenite of soda. The Transvaal last year had spent £14,000 upon locust destruction. In addition they had a large stock of spray pumps on hand. They had ordered another 500 pumps and 60 tons of arsenite of soda. Basutoland last year had spent £1,875 upon locust destruction. They had ordered a considerable amount of arsenite of soda and additional spray pumps. Bechuanaland so far had done nothing except collect reports, but they were prepared to recommend the expenditure of £1,000 if the Conference advised their Government accordingly. No report had been received from Rhodesia. Swaziland had asked the Transvaal Government to obtain material for them, and they would buy it. That was the condition of affairs up to date.

The committee had also passed resolutions to the effect that each Colony should provide a special organisation for supervising and controlling the work of locust destruction, as it was thought that it should be kept in the hands of the Government, who were able to control and co-ordinate the whole work.

FUNGOID DISEASES OF LOCUSTS.

The committee also wished to state, Mr. Smith continued, that, with regard to the destruction of locusts by natural agencies, they had carefully considered the reports appearing in the papers that locusts had been destroyed by locust birds and fungoid diseases. Undoubtedly,

with regard to the latter the past season had been very favourable, but the destroying of the locusts in that manner did not go far enough, and they were far too uncertain and unreliable to be depended upon. The committee were of opinion that up to the present the only practicable way of destruction was in the early stages by means of the arsenical solutions.

The Hon. A. J. Fuller said that in Cape Colony, in the Cradock district, swarms of locusts had been destroyed by a kind of fly.

Mr. Howard replied that, speaking for the Transvaal, the fly did not exist in sufficient numbers.

RESOLUTIONS ADOPTED.

The following resolutions were put to the meeting and carried:—

1.—“That in the opinion of this Conference it shall be imperative that each Colony shall take such steps as shall effectually destroy and prevent the spread of locusts in the voetganger stage.”

2.—“That, in view of the information which has come into the possession of the Locust Bureau since the date of its establishment, it is desirable that the various South African Governments should make every effort to destroy locusts.”

3.—“That, taking into consideration the experience of various Colonies which have been carrying on an active campaign against locusts the efforts to destroy locusts in the past have met with a large measure of success, and the evidence goes to show that the expenditure on locust destruction is so small in comparison with the value of the crops saved.”

4.—“That the best agency for the destruction of locusts is the sweetened solution of arsenite of sodium.”

5.—“That in the opinion of this Conference it is imperative that the Government of Rhodesia should co-operate in the destruction of locusts in the voetganger stage as is the practice in other Colonies, and that His Excellency the Governor be respectfully requested to notify them of this resolution.”

General Smuts then thanked the delegates for having come up and taken part in the important deliberations; and the members of the Central Locust Bureau who had gone into the matter so carefully that day deserved the gratitude of the Conference.

The Hon. A. J. Fuller and the Hon. W. A. Deane briefly replied.

Upon the following day the members of the Bureau held a special sitting and considered a number of important subjects. Among other matters it was decided that a report of the Bureau, covering the work already accomplished in connection with locust destruction, should be prepared for publication. A sub-committee, consisting of Mr. Johnstone (O.R.C.), Mr. Howard (Transvaal), Mr. Dewar (Cape Colony), and Mr. Fuller (Natal), was accordingly appointed to draft the report.

Agriculture in the Transvaal.

A YEAR'S PROGRESS.

"Another criticism . . . levied at the Department is that it is too scientific . . . but science simply means systematic and intelligent inquiry into the working of nature. Agriculture is above everything else dependent upon natural processes, and all advances in the art of agriculture must be based upon a better understanding of the laws which govern those processes."—

Report of Director of Agriculture, 1905-6.

AN interesting publication is the last annual report of the Transvaal Department of Agriculture (1905-6), copies of which have recently come to hand. The volume, which consists of 322 pages, contains the separate reports of all the several branches of the Department, which, in their *ensemble*, present a tolerably good idea of the work which has been accomplished by the Department during the year under review, and also to a certain extent of the conditions under which agriculture is being carried on at the present time in the Transvaal. Most evident is the lack of co-operation on the part of the farmers; and some of the difficulties that lie before the Department of Agriculture are foreshadowed in the Director's report. Speaking of the very lax and unbusiness-like methods followed of purchasing their supplies or disposing of their produce, he says that the farmers, as a rule, "have dealt with the nearest storekeeper, bartering produce for supplies, and, as might be expected, usually getting the worst of the deal; the more enterprising farmers sent their produce to the towns, but as a rule there was no system in their marketing, and they were at the mercy of the middleman or the ring of dealers who surround the marketmaster. For the farmers to abandon these easy-going methods, which have become a second nature to them, will be a severe wrench, and tact and patience will have to be exercised in order to induce them to fall into line, to fulfil the obligations, and submit to the regulations which co-operation involves." The present primitive individualistic methods, he adds, cannot continue; the hope of the farmers lies in organisation and co-operation, and every effort will have to be made to foster these ideas.

Whilst on the subject of co-operation, it will be of interest to refer to the remarks of the Horticulturist (Mr. R. A. Davis), in his report, on the matter of the marketing of fruit. "Cape and Natal shippers," he says, "must look upon our market as an Eldorado. The extremely systematic methods which some of these gentlemen adopt should afford an object lesson for the future guidance of our own growers. Not a single small town in the Transvaal is left unexploited." Let not Natalians, however, take unto themselves too great a share of this eulogy.

The Cape is a long way ahead of us in the matter of organised fruit export (of which a study of our local fruit market affords ample confirmation), and we, in our turn, can learn much from the Cape methods. That the Cape has a big share in the Transvaal fruit trade is evidenced by the next couple of sentences of Mr. Davis' report, which continues:—"I have made a practice during my various journeys to ask for fruit at every stopping place. On many occasions, if not most, I have been supplied with the Cape grown article." However, "at present our supplies of bananas and pineapples, mangoes and paw-paws, avocado pears, etc., are entirely drawn from Natal."

The work of the Department of Agriculture is, and will be, made easier by reason of the fact of the good relations that exist between the farmers and the Department. Agricultural and other societies dealing with agricultural affairs, advisory committees and a vast number of individual farmers have taken "a genuine and sympathetic interest in the work of the Department," and, "by their ready co-operation and kindly criticisms and suggestions, have done much to assist it and in turn to render it capable of assisting them." The interest in and appreciation of the work of the Department displayed by the farmers are evident in various parts of the report; and there are further not wanting indications of the enthusiasm of the various officers of the Department for their work.

SEASON AND CROPS.

Owing to the continued drought, lasting three years, dams have been empty, springs have been drying up, and streams running low. Water for irrigation has been less plentiful than usual, and winter crops have as a consequence suffered. In some parts of the country, particularly the south-west, west and north, pans have been dry and wells low, so that even drinking water for stock has been scarce. "The expected autumn rains failed," says the Government Agrostologist and Botanist (Mr. J. Burt-Davy) in his report, "leaving the veld short and causing it to dry up early; much of what was left was subsequently cropped by large swarms of flying locusts, and had no chance to recover before winter set in. By August and September stock-farmers were hard put to it to keep their animals alive, and many had to kill their early lambs to save the ewes. The dryness of the winter may, however, prove a blessing in disguise; it has convinced stock-farmers, as never before, that they must provide winter feed for their animals; when they have learned to do this regularly they will be less at the mercy of the seasons."

The season was not favourable, the Director of Agriculture states, to summer crops. The greater portion of them were sown late, and, owing to the hot, dry weather, did not do well; and, in addition an early frost caused great damage to the mealies. The late summer crops and

the early winter crops also suffered from the enormous swarms of locusts which invaded the colony in the autumn.

Experiments have been undertaken with various grasses and other pasture plants. The plants which, in spite of the phenomenally dry season, have given the most satisfactory results are, among others: Sheep's Burnet, Sheep's Parsley, N.S. Wales Blue-grass, Rescue-grass, *Paspalum dilatatum*, Tall Fescue, Meadow Fescue, Sainfoin, and the Saltbushes. "I now feel confident," says the Botanist, "that, by sowing down mixtures of these and some other grasses, in various combinations to suit different soils and climates, we shall be able to lay down permanent pastures for the winter grazing of stock at a cost probably not exceeding 35s. per acre for seed."

INDUSTRIAL CROPS.

Sugar-beet, chicory, linseed, pea-nuts, castor-beans, and cotton are all being experimented with. Cotton has been highly satisfactory in the eastern middle vlei, particularly on the foot hills of the Drakensberg, where there is no frost, and the picking season can be prolonged well into the winter. Long-staple American Uplands are stated to have given the best results, particularly the "Silk long-staples," such as Cook's Allen's, and Doughty's. A power cotton gin has been erected; and in order to encourage the growth of cotton in the district, arrangements have been made whereby farmers can get their cotton ginned and baled at the factory, and receive an advance of approximately two-thirds of the value of the lint, the balance being paid after the disposal of the cotton in England.

LIVE STOCK.

The Director comments upon the lack of care and attention bestowed upon animals, which, he says, is one of the most conspicuous and regrettable features of stock-farming in the Transvaal. "Too often the animals are practically left to shift for themselves; during the day they are herded on the veld, and at night crowded together in an open kraal, in which, during wet weather, they stand knee-deep in mud. Though the nights are long in this country it is the exception rather than the rule for any provision to be made for feeding the stock whilst in the kraal, or to provide them with any food other than what they could obtain for themselves in the veld. In the older days, when quantity was of more importance than quality, and individual animals were not of great value, such treatment may have been justified, but that period has passed, and animals must now be regarded as artificial products which have been brought to a great state of perfection by selection and good management, and which require the utmost care and attention." He recommends that farms should be enclosed so that the stock can remain at liberty day and night, that shelter be provided from the wet and cold, and that, instead of trekking the animals about the

country in search of food, other countries be imitated and the produce and the arable land be employed to eke out the deficiency of the veld.

VETERINARY.

The condition of the Colony as regards contagious diseases of animals continues to show marked improvement. East Coast Fever has not only been prevented from spreading, but has been gradually overcome, and large areas once infected with the disease have been cleansed of it. The progress which has been made in the direction of stamping out the disease has been effected by a continuation of the policy of restricting the movement of cattle in infected areas, and the fencing of infected farms or areas; and the fact that the disease is being gradually overcome, and that in no case has any extension of the disease occurred through any authorised movement of cattle. Mr. Smith remarks, testified to the wisdom of that policy. There can be no doubt, he adds, that if the policy now adopted is vigorously enforced the disease will be entirely exterminated before long, though owing to the fact that its last strongholds will be parts of the Colony most thinly populated with Europeans and thickly populated with natives, it will be more difficult to deal with here than it has been in those parts which have already been cleared.

At the urgent request of the sheep-farmers in the principal sheep-raising districts, the scab regulations have been amended so as to render them more stringent and to provide for the compulsory dipping of all flocks at a certain season of the year. The number of private dipping tanks in the Colony is said to be rapidly increasing. The annual trekking of sheep from the high to the low veld, and *vice versa*, is found to be a very troublesome factor to be contended with, as the main stock routes soon become contaminated by such movements, and it is almost impossible to trek sheep without their contracting the disease, and thus spreading it afresh in the country. Trekking, however, it is stated, is likely to be less prevalent in the near future, so that the evil will be diminished in intensity, although, "it is certain," the Director adds, "that if the disease is to be extirpated, and the farmers through whose farms these sheep trek are to be protected from infection, as is only right they should be, measures will have to be taken to see that all sheep are dipped and clean before they are allowed to travel"*

The preparation of a serum for the inoculation of sheep against blue-tongue was commenced during the year under review, but so far little use has been made of it, as it is considered desirable to test it upon a more extended scale before introducing it to the public. The inocula-

* It will be of interest to farmers in the Northern parts of Natal to refer to the resolutions passed at the Inter-Colonial Veterinary Conference regarding the movement of sheep from one Colony to another for the purposes of winter grazing: *vide* page 352 of the April issue of this *Journal*.

tion of mules against horseshickness upon a large scale was also put into operation for the first time. In the Transvaal and Swaziland 2,325 mules were inoculated, and 388 in Rhodesia. The loss due to the operation was 3.8 per cent in the one case and 2.3 per cent. in the other. The losses from horseshickness amongst these mules, plus 522 previously treated, or 3,235 in all, amounted to .6 per cent., but it is pointed out that this figure includes several deaths the cause of which could not be determined with certainty, and which may or may not have been due to horseshickness. Of these animals 1.3 per cent. showed signs of the disease re-appearing, but recovered upon being rested. Thus, for the first time in the history of the country, it is stated, it was possible to trek with mules in any part thereof throughout the whole summer.

CONDITION OF THE FARMERS

The drought, locusts and early frosts caused heavy losses to many farmers, reports the Director, and affected all to a greater or lesser extent. The sheep-farmers on the high veld and in the south-west had a good year and are prospering, and the best of the citrus fruit and tobacco-growers and arable land farmers also had a good season. The price of meat and produce of all kinds still remains very high, compared with the prices obtained for articles of similar quality in other countries, and, as the list of imports shews, the local supplies do not nearly equal the demand.

In conclusion, the Director remarks that many of the difficulties against which the farmers are now contending, arise from causes which were in operation prior to the war, and are in the nature of a gradual and permanent change in the economic conditions of the country rather than that of a temporary embarrassment. The old order is yielding place to the new in agriculture in the Transvaal, as in other things; and the farmers are having to accommodate themselves to altered circumstances; always a difficult and disagreeable task, particularly to the older generation.

In County Tipperary, Ireland, there is a co-operative farmers' bacon-curing factory, the membership of which is 3,800. It is a noteworthy fact (says the *Live Stock Journal*) that as soon as a factory of this sort is laid in any district, the farmer observes that there is money in catering for it. England lacks such an institution yet. The lesson to be learned from Denmark is that there should be one or two factories in every English County.

Chillies or Capsicums.

CULTIVATION AND PREPARATION FOR MARKET.

"In the early seventies the capsicum market was chiefly supplied by Sierra Leone, Natal, and India," says a writer in the last issue of the *West Indian Bulletin* to hand. "Now, supplies are largely obtained from Zanzibar and British East Africa." Simmonds, in his *Tropical Agriculture*, says: "In Natal the capsicum plant grows in perfection, and yields a profit to a limited number of growers. The export of Cayenne pepper has averaged, for ten years, £600 per annum, exclusive of inland and local consumption. But the export has been declining for some years. The shipments of cayenne in 1889 were only 17,277 lbs.; but in 1883, 187 cwt., valued at £510."

From a position as one of the leading producers and exporters of cayenne pepper in the world, Natal has fallen to a very secondary place. The Customs returns do not distinguish between cayenne and other peppers, so that it is not possible to tell to what extent Natal now contributes to the world's market, nor is it possible to give any indication of the South African market for this product. Our production is, however, much lower now than it used to be, and interest in the crop appears to be waning. Past experience would seem to indicate what possibilities lie before this product; and a renewal of interest in its cultivation appears to be warranted, provided a sufficient profit is obtainable.

SPECIES AND HABITAT.

The chilli plant belong to the genus *Capsicum*, of the natural order *Solanaceae*. The best-known species are *Capsicum annuum*, *C. minimum*, *Roxb.* (*C. fastigiatum*, *Blume*), and *C. frutescens*. The kind chiefly cultivated in Natal is a variety of *C. annuum*.

Of *C. annuum* there are said to be seven varieties, differing chiefly in the length, shape, and colour of the fruit, some being round, others oblong, obtuse, pointed or bifid, smooth or rugose; and red, white, yellow, or variegated. *C. minimum* closely resembles *C. annuum*, but is distinguished by the more acute corolla lobes, the smaller seeds, and by the pod being erect, nearly cylindrical, and yellow when ripe.

All the species are supposed to have come originally from some part of the American Continent. *C. annuum* is a native of equinoctial America, most probably of Brazil. *C. frutescens*, also, is supposed to have come from South America.

Among other countries, and besides Natal, capsicums are grown in India very extensively, Zanzibar, British East Africa, Sierra Leone, Japan, and China.

USES OF CAPSICUM.

The hot, pungent property of the fruit of the plant is due to the presence of an alkaloid known as capricine, and it is on account of this property that the genus has received its name, derived from the Greek *Kapto*, "to bite."

Capsicums are used chiefly as a condiment. Simmonds (*Tropical Agriculture*) says: "There is an enormous consumption of chillies in India, as both rich and poor daily use them, and they form an important ingredient in the curries and chutneys in general use; when ground into a paste between two stones, with a little mustard, lard, oil, ginger, and salt, this forms the only seasoning which the millions of poor in the East can obtain to flavour their insipid rice." Besides being dried and ground for use as pepper, the fruit is also used, when green, for pickling, and when ripe for mixing with tomatoes, etc., to make sauces.

Capsicums have also their medicinal value. Dymock, according to Watt's *Dictionary of the Economic Products of India*, states that, as a drug, pepper is considered by the natives as stomachic and stimulant, and is used externally as a rubeficient. O'Shaughnessy says: "It has been employed with success as a topical application to elongated rivula and relaxation of the pendulous veil of the palate. Made into a lozenge, with sugar and tragacanth, it is a favourite remedy for hoarseness with professional singers and public speakers. In putrid sore-throat, whether symptomatic or strictly local, gargles of an infusion of red pepper are often very usefully resorted to." Murray (*Plants and Drugs of Sind*) says: "It is employed in medicine in combination with cinchona in intermittent and lethargic affections and also in atonic gout. It is a valuable adjunct to bitters, tonics, and other stimulants in weak states of the stomach; in cold leucophlegmatic habits, dyspepsia and flatulence, and as a gargle in relaxed states of the throat it is highly extolled and has also been used with success in the advanced stages of rheumatism." According to the same *Dictionary*, chillies are used as medicine in typhus and intermittent fevers and in dropsy; they are regarded as stomachic and rubeficient. In native practice in India they are prescribed in gout, dyspepsia, cholera, and ague.

CULTIVATION.

According to *The Gardener*, a light well-manured soil is the best for all kinds of capsicums. The plants should be picked out at about four inches apart when they attain a growth of three inches, and afterwards put out into a bed of rich, light earth when they attain six inches in height, giving them a good supply of water and keeping them clear from weeds.

Mr. W. R. Buttenshaw, in the *West Indian Bulletin* already referred to, also gives some useful information regarding the cultivation of capsicums. Their cultivation is, it is stated, quite simple, as they re-



SEED PODS OF *MARTYNIA FRAGRANS*.

Ripe above, green below.

(See "Notes and Comments.")

quire merely the ordinary care that should be given to all garden crops. The land which is to be planted with capsicums should be well prepared beforehand, being brought into good tilth by ploughing or forking. If the soil be poor, manure may be applied while the land is being prepared. Fresh manure applied after the plants have been set out is apt, it is stated, to produce excessive leaf growth and poor yields. The seeds should not be broadcasted, but should be sown in a well-prepared nursery bed, and covered to a depth of about half an inch with loose sandy soil. The seeds take from twelve to twenty days to germinate. The seedlings should be transplanted as soon as they are large enough to handle, say, about 4 inches high. They should be set in rows so that the land can be properly weeded and cultivated. The rows should be about two feet apart, and the seedlings should be set about the same distance apart in the rows. Watering may be necessary should the weather be dry, but should cease when the fruits begin to ripen. The cultivation would easily lend itself to irrigation if necessary. It is desirable that the plants should be moulded up as soon as they are well established. Frequent weeding will be necessary; the soil between the rows can be worked with a cultivator, or hoed.

DRYING.

The pods begin to ripen in about four months from planting, and the ripening continues for some time. The plants should be gone through once a week, and all the fruits that are fully ripe gathered. They should not be allowed to fall to the ground. Dry weather should, if possible, be chosen for picking. Any fruits having breaks or blemishes should be discarded, as they would decay before drying properly.

If chillies are stored damp, they will soon become quite spoiled. They should, therefore, before storing, be spread out in the sun to dry. A warning should here be given about spreading the chillies on the bare ground. This practice has been followed in Zanzibar; and the chillies, on account of their resulting dirty condition, have fetched the lowest prices. In India the practice is to spread the chillies out on mats for the purpose of drying. In his last Annual Report, the Agricultural Instructor for Nevis recommends drying the capsicums in the sun and wind in trays with fine wire-netting bottoms, so as to allow the air to circulate freely. "These trays should fit into a rack one above the other but with a good air space between them; the trays can then easily be put out in the sun, and, if rain threatens, run into their rack under cover instantly. Peppers lose roughly about 70 per cent. of their picked weight in drying (about 2 per cent. are stalks which have to be removed before shipping, although they should always be picked with them on); some 6 to 7 per cent. will, with the most careful picking and drying, be slightly discoloured and had better be rejected from ship-

ment; they will be quite good for seed. The remaining 23 or 24 per cent. are fit for the market."

YIELD.

As regards the yield of capsicums, 1,250 lbs. per acre is stated to be a paying crop, but, under specially favourable conditions, double that quantity, it is said, may be obtained.

MANUFACTURE OF THE PEPPER.

The cayenne pepper of commerce is obtained chiefly from the pulverised chillies or fruit pods of one or two species (*C. annum* and *C. fastigiatum*). The ripe fruits are first dried and ground; they are then mixed with wheat flour and made into cakes with yeast. These cakes are baked till hard, and then ground and sifted.

With regard to peppers on the market, the *West Indian Bulletin* already referred to quotes a note by Mr. E. W. Holmes in the *Pharmaceutical Journal* (1899), portion of which runs as follows:—"During the last three or four years there has been in commerce a very bright-red variety of *Capsicum minimum*, Roxb. (*C. fastigiatum*, Blo), said to be imported from Japan. In consequence of its clean, bright, and attractive appearance, it has commanded a higher price than other varieties. Mr. J. C. Umney has recently directed my attention to the fact that this variety is less pungent than the Sierra Leone and Zanzibar varieties, although far superior to them in colour. . . . Mr. Umney points out that when an alcoholic tincture of the Japanese and Zanzibar varieties is respectively diluted with about 14 parts of water, the former gives a much clearer solution than the latter, indicating less oily matter. . . . The powdered Japanese cayenne peppers, placed side by side, are indistinguishable in point of Colour."

DISEASES.

Capsicums are apparently not susceptible to insect attacks, though there are two fungoid pests which sometimes cause trouble. These are known as "pink anthracnose" (*Gloeosporium piperatum*) and "dark anthracnose" (*Colletotrichum nigrum*).

As far as observation in Natal go, the chilli plant has, until recently, been remarkably free from the attacks of insects. Lately, however, attention has been drawn to a plant-bug, whose host is the troublesome weed, the tree-tobacco (*Solanum gigantium*?—known locally as the "bug plant"), that is now turning its attention to the chilli and tomato plants. In an article on "Tomato Troubles," in the March, 1907, number of this *Journal*, Mr. Albert Kelly states that these bugs have been particularly mischievous in their effects upon chilli plants. It will be of interest to reproduce the method of treatment described in that

article:—"Hand-picking is the most practicable method of dealing with this pest. It should be done in the early morning, when the insects are lethargic in their movements, and may easily be caught. Quite the simplest method of killing the bugs is to provide a tin partly filled with water, on the surface of which a film of paraffin or some other oil is floated. When dropped into this, the oil enters through the several breathing holes or stigmata of the body, and kills the insects readily. Whilst hand-picking the insects, a good look-out should be kept for their eggs. These are laid in clusters, upon the under surface of the leaves, and much resemble a group of small, dark-brown, glass beads. The leaves carrying the eggs should be picked off and dropped into the tin, along with the bugs."

There are also two fungoid pests which sometimes cause trouble, according to the article in the *West Indian Bulletin* already quoted. These are known as "pink anthracnose" (*Gloeosporium piperatum*) and "dark anthracnose" (*Colletotrichum nigrum*).

Sugar Cane Experiments in West Indies.

For several years past experiments with sugar canes have been conducted in the West Indies, under the direction of the Imperial Department of Agriculture. The objects of the experiments are to discover varieties of sugar-cane which are likely to increase the output of sugar and to aid planters in combating the ravages of fungoid diseases and insect pests. It is an essential feature of these experiments that the canes shall be cultivated in the same manner as the ordinary crop of the estate, so as to institute a close comparison on the most practical basis between these canes and those ordinarily grown.

During the season 1905-6 experiments were conducted on sixteen estates, eight in Antigua and eight in St. Kitt's. The total area occupied by the Experiment Stations in both islands was 96 acres. The first part of the report on the results of this set of experiments—dealing with varieties of sugar-cane—has just come to hand. The results show that, at Antigua, seven canes, viz., B. 156, D. 109, Sealy Seedling, B. 208, B. 376, Queensland Creole, and B. 393, stand out as specially worthy of attention. Of these, B. 156, B. 208, Sealy Seedling, and D. 109 are amongst those to which attention has been drawn in the two

previous reports. B. 208 and Sealy Seedling are now well-known, says Sir Daniel Morris, the Commissioner of Agriculture, and can be recommended for fairly extensive planting. D. 109, Sealy Seedling and B. 156 have also, it is stated, given the best results as ratoons, the first-mentioned possessing the power of ratooning in a high degree. In connection with the experiments in Antigua, attention is again directed to the unfavourable climatic conditions in Antigua during the season. The effect of the severe drought was such as to cause the sugar crop of the island to drop to 7,920 tons, while the average crop, during normal years, is about 14,000 to 16,000 tons.

In the experiments with plant canes at St. Kitt's, B. 254 heads the list of averages with 8,072 lbs. of sucrose per acre. This cane, says Sir Daniel, has suddenly come to the front, and its future behaviour will be watched with interest. B. 208 has again proved a very satisfactory cane, and is considered worthy of extended trials at the hands of planters. Sealy Seedling, D. 109, and D. 116 are also recommended by the West Indian Department of Agriculture for cautious experimental planting. As ratoons, the White Transparent, D. 95, and D. 74 have given the best results of the season.

Appended to the report is a summary of the results of a careful inquiry made among planters by Dr. Watts, the Government Chemist and Superintendent of Agriculture, on the subject of sugar-cane diseases in Antigua. Evidence having been found of rind fungus and root fungus in certain localities, it was deemed prudent to direct the attention of planters to the subject of diseases amongst their sugar-canes, and to this end a circular letter was sent to a number of estates. From the inquiry it was gathered that the planters themselves are of opinion that no serious amount of disease exists amongst their canes at the present time, and that, on the whole, the amount is less than it has been during the past five years. Dr. Watts is, however, inclined to think that the insidious nature of the attack in the case of root fungus leads planters very frequently to overlook its existence except in bad cases. "Very often," he continues, "the crop may be seriously lessened by the presence of root fungus without any appreciable amount of dead cane being seen. As is now known, the root fungus attacks the tips of the roots, and by destroying them prevents the cane obtaining a full supply of moisture from the soil, hence there is often confusion between the effect of drought and the effect of root fungus. My own observations lead me to think that root fungus is more widely distributed than planters imagine, and I would urge their very careful attention to this point.

"The remedies for root fungus," Dr. Watts concludes, "appear to be planting of other crops than cane for a year or two. Cotton makes an excellent rotation crop in this respect," and one planter, Dr. Watts adds, has directed attention to good results in combating root fungus by growing sweet potatoes as a rotation crop.

Cattle Dipping in Arsenite of Soda.

IN the May issue of the *Agricultural Journal of the Cape of Good Hope* appears an interesting letter from Mr. Llewellyn J. Roberts, of Cottesbrook, on the subject of the dipping of cattle in arsenite of soda. Before he started the systematic use of arsenite of soda, in the strength of 5 lbs. to 100 gallons of water, 21 months ago, Mr. Roberts' farm was infested with ticks of all descriptions. The Bont tick (*Amblyomma hebraeum*) and the Blue tick (*Rhipicephalus decoloratus*) were the most abundant, the latter being so numerous that cattle were actually dying from the irritation caused by their numerous bites. Cattle that died from this cause had a jelly-like substance under the skin (probably serous fluid congealed, Mr. Roberts thinks), and the skin was highly inflamed. From one calf Mr. Story, who was then conducting experiments for the Cape Government, cut a piece of skin four inches square, and on which 1,700 ticks were counted. Several of Mr. Roberts' heifers came in with their first calf without a single living teat whereon to suckle it, this being due to the septic bite of the Bont tick. For years, Mr. Roberts says, he had only been able to rear about 20 per cent. of his calves owing to liver and other diseases.

Before the advent of the bont tick this farm was carrying thousands of sheep, which had to be sold out on account of heartwater when the ticks arrived. "Sheep-farming was therefore impracticable, and cattle-farming was also doomed, had not dipping come to the rescue."

With the exception of two months last winter, cattle-dipping has been done every fortnight since August, 1905. "The result to-day is," remarks Mr. Roberts, "that the blue tick is stamped out entirely, and the bont tick nearly so, indeed one has to hunt to see one on my cattle. I have reared about 95 per cent. of my calves this season, and the cattle on the farm look sleek and fat, shewing no ill effect from the continued dipping in arsenic. It is a pleasure to see the heifers and cows come into the kraal with all four teats intact as of old."

When dipping was first started on Mr. Roberts' farm, some of the cows scalded a little, though never very badly, but now they are never troubled in that way. Only one calf, to Mr. Roberts' knowledge, has died through the direct effects of the dip. "There is no doubt, however," Mr. Roberts says, "that working oxen do suffer if worked shortly after dipping, especially well-bred ones, when the weather is hot. They blow a great deal, and if not outspanned soon lie down and die. I do not wish it to be understood that I recommend arsenic as a safe dip. I simply give my experience, which amounts to the dipping of about 12,000 cattle in arsenite of soda with the loss of one calf, directly, and two oxen indirectly by working them in the hot sun too soon after dipping.

"Mr. Kent, of Grasslands, near Fort Brown," Mr. Roberts continues, "tells me he has used the dip in the proportion of 6 lbs. to the hundred gallons for several months without ill effects, except that his calves are inclined to purge after dipping. I know losses have occasionally occurred at other tanks, notably at the Alice public tank, but it is questionable whether in these cases there was not some mistake in the mixing. I would advise anyone starting to use arsenite to use it at a weak strength for the first once or twice, and to gradually increase the strength; then also to be quite certain that the exact capacity of the tank is known, so that if rain happens to get into the tank the amount so added will be known, or if evaporation takes place that amount is also known and allowed for.

"In combating the tick plague we have been wonderfully fortunate, first in having an expert like Mr. Lounsbury to work out the life history of the tick and tell us what diseases it causes. Next in the Veterinary Department discovering so cheap and effective a dip as arsenite of soda (it costs about 1s. to dip 100 head of cattle). Thirdly, in cattle taking so readily to the dipping and being so little affected by it. (I find it as easy to dip a mob of cattle as to drive them into a kraal). And fourthly, that cattle are the principal hosts of the tick. Had sheep been the principal hosts, we would have had a much more difficult task, for they cannot be dipped so often in arsenic as cattle, and are a great nuisance to dip. I would rather dip 1,000 cattle than 500 sheep."

LEGISLATION.

Seeing that dipping is now beyond the experimental stage, Mr. Roberts is of opinion that it is time to consider whether some protection cannot be given to the man who cleans his farm, as it is clearly of little benefit to him if, after the expense of clearing his farm of ticks, he should be liable to reinfection by the first lot of cattle driven over his farm by his neighbour. The difficulties in the way of stringent legislation are many, but Mr. Roberts thinks a start might be made by making it illegal for cattle from a tick area to travel over a clean farm, or one on which systematic dipping is being carried out, whether by road or otherwise, unless accompanied by a certificate from the owner of a tank that such cattle had been dipped in some recognised Government dip within 10 days of such passage. Heavy penalties could be inflicted for issuing false certificates or breaking this law.

"This appears to me the mildest form of legislation," Mr. Roberts concludes, "which could be enacted for the protection of the clean farm, and I do not think it would fall more heavily on anyone than the object gained would justify. Thorough spraying might be made an alternative of dipping, and spraying with paraffin would get over the difficulty of working oxen affected by arsenic. I fear if anything more drastic, such as compulsory dipping in the tick areas, were proposed it may make more enemies to the cause than friends."

Tobacco Cultivation in South Africa.

WITH SPECIAL REFERENCE TO NATAL.

By E. R. SAWER, Director Experiment Stations.

THE verdict of competent judges upon South African tobacco shown at the recent Exhibition in London has been awaited as a favourable starting point for the discussion of ways and means calculated to place Natal-grown leaf in a favourable position on local and outside markets. And from this it very obviously appears that no effort can be spared if lost time is to be retrieved and our industry brought into line with that of neighbouring Colonies, whose products are already attracting favourable attention at the principal centres of consumption.

The following review, published by the Colonial quarterly *Tobacco*, serves as a useful index to comparative progress in different parts of South Africa, and the need for a radical modification in our own system:—"During the Exhibition specimens of leaf were sold as samples, and the verdict of many of the public was that the goods, whether cigarettes or tobacco, were voted very good, if different altogether in flavour from the customary smoking materials. The cigars were not a complete success, and the production of a flavoury, equal-burning leaf at all suitable for high-class cigar making appears to lie rather far in the future. The cigarettes of Rhodesia, the Transvaal and Cape Colony were the best examples of the progress made in the industry in South Africa, while the many excellent pipe tobaccos in various strengths and degrees of fineness of cut were generally admired.

"A look round the exhibits began at the Transvaal—the first home of the 'Boer' tobacco. Here the display included cigarettes, tobacco, cut and in the roll and leaf, from Mr. van Erkom, of Pretoria and Johannesburg. This firm has lands in Magaliesburg, and it is here that these well-known tobaccos are grown. Another striking exhibit was that from the Transvaal Government at Zoutpansburg, who showed their 'Lataba' brand of tobacco and cigars. They had cigarettes of two grades and tobacco in four or five. Cigars and leaf were also represented, as was snuff. Messrs. Jack, Ltd., of Johannesburg, had some of their 'Crocodile' brand, made up from Magaliesburg tobacco, on exhibition. A special boast of the De Jayer & Co., Church Street West, Pretoria, who had an interesting show of goods, is that no chemicals or flavourings of any sort are used, a claim which many others represented could have also sustained. Tobacco, wound and pressed into fantastic shapes, was shown by Mr. Victor Roodekloof. Messrs. G. Bourdos & Co. showed

good results from Turkish seed, the cigarettes selling at 5s. per 100.

"About five Natal firms had exhibits. Mr. W. Starr, of Verulam, showed some cheroots of good appearance. W. Starr manufactures from his own-grown tobacco, and also works up other tobaccos. He may be looked upon as one of the most advanced pioneers in the South African industry. Messrs. Chetty & Co., of Durban, also had some cigars on view. The Tobacco Planters, Ltd., and Messrs Freerks & Co. also had tobacco—leaf and cut.

"The Orange River Colony had its industry reflected in the firm of Messrs. Alexander Wright & Co., of Vredefort, whose roll tobacco was supplemented by cut tobacco cut fine, medium and coarse, to suit all tastes. Mr. B. Pretorius, of Welgerust, also showed some of the characteristic twisted tobacco, in the outer wrapper of which the leaf is used intact, including the heavy stalks, which gives to this South African roll and twist a strangely 'ropey' appearance.

"Mr. H. W. J. Van der Veen, of Oudtshoorn, and Mr. John C. Raubenheimer, of Seymour, were among the exhibitors from Cape Colony. Some cigarettes grown from Turkish seed in the Paarl district were a creditable sample. Some of these under the brand name 'Aroma' had been made by the Court Cigarette and Tobacco Factory of Port Elizabeth, and were selling at 6d. per packet of 10, and being given away singly as samples. Mr. Van Wyk, of Fairbairn, had a fine show. Mr. J. H. Voogt, of Seymour, showed pipe tobaccos in packets and loose cut tobacco, showing, too, what a good mixture may be made by the use of various growths. The district of Ladismith, in Cape Colony, is that famous for the Calabash pipes, of which there was a good display from Mr. H. Broide. . . .

"The Rhodesian section triumphed with its 'Turkish' cigarettes and a splendid show of bright Virginia from the South African Plantations, Ltd. The cigarettes from Messrs. Barker Bros.' factory, Bulawayo, were examples of the neat packing and careful manufacture of well-flavoured and free burning tobacco. A creditable display of Turkish-Rhodesian leaf was noticeable, some of the best being grown by Mr. S. Briggs, of Mazoe, Southern Rhodesia. There was cigar tobacco grown at Melsetter, and Mr. L. Black, of Salisbury, was also represented."

More critical and, for that reason alone, more valuable is the report of the judge, Mr. Freeman, whose opinion carries weight as that of a practical manufacturer:—

"I exceedingly regret that the number of samples of tobacco exhibited to me was so meagre as to give me (even with the assistance of some South African made segars) but little opportunity of expressing any decided opinion of their merits.

"The tobacco grown in Natal was rough, burly, coarse, and would

be quite unfit for the European market. It appeared to have been allowed to grow rank, and the stalk or mid-rib must have been at least 30 per cent. of the entire weight. The veins were of equal comparative thickness, and would render the tobacco on this account unfit for a binder, the only possible purpose for which it could be used. . . .

"It should be borne in mind that the tobaccos required for segar, cigarette making, or pipe purposes, are all of them absolutely distinct.

"The atmospheric conditions, the soil, cultivation or treatment, are for each class quite different, and require the services of special experts to advise and superintend. Such experts can only be obtained by payments of high salaries, but the expense could be divided between a district or colony, and services charged *pro rata*.

"At any rate if tobacco is to be grown successfully the rough-and-tumble methods of 200 years ago must be abandoned, and the up-to-date and scientific cultivation of successful competitors be copied.

"I feel confident that any care spent on cultivation will be more than repaid, and that should South Africa succeed (and there is every reason to believe she can do so) in producing tobaccos to fill any of the above requirements, I am convinced that my manufacturers here will gladly welcome such, and give their fellow-countrymen a full share of the profit of this cultivation, which is now all practically entirely absorbed by the foreigner. . . . If the natural outlet of South African products be the Motherland then the requirements should be well understood. Raw material reaching that country from the Colonies should be able to compete with foreign, if it does not actually beat it. South African tobacco is not doing this. More care and system are needed. Haphazard ways of growing and curing will, of course, never do. There are now, however, signs that the whole course of South African culture is changing for the better. Expert advice is being applied, and the distribution of seed under Government auspices has had a good effect. As yet what has been done successfully has been in pipe tobaccos and more recently in cigarette 'Turkish' leaf. Cigar leaf of good quality has not yet been produced in the South African Colonies. This is the most backward of all descriptions of the culture experiments. But time and care will work wonders."

With a view to securing a second opinion in the latter connection, a selected box of cigars was forwarded to the Managing Director of the United Tobacco Companies, Capetown, who had for years been one of the largest buyers of leaf on the London market. His report reads that "the tobaccos are a great improvement over the ordinary Natal cheroot, but they still leave a great deal to be desired, especially in the way of flavour. The two great points in their favour at present are, first, that the tobacco burns well (which seems to be a peculiarity of all South African tobaccos, with the exception of the Natal leaf which is grown on the coast), and, secondly, that they are not strong. They do, however, lack

aroma, and have somewhat of an earthy taste, not unlike that found in the common classes of Brazilian. I should think that greater attention must be paid to the fermentation of the leaf, because that is the point in the curing process where the ultimate flavour of the tobacco is developed.

"I am glad to hear that you are starting experimenting on flue-curing, and I feel certain that all the flue-cured leaf for some time to come will meet with a very good market. Little over a year ago I had the pleasure of calling on your Director of Agriculture in Pietermaritzburg, and had a conversation with him then about the possibilities of improving the Natal leaf, and on that occasion I heard, for the first time, of the Weenen Irrigation Settlement and the possibilities of tobacco culture at that point, and I wish you every success with your experiments there. As I understand it, the farms are all close together, and the leaf should be handled at the central point."

The writer has no wish to paint an unnecessarily gloomy picture of the present state of tobacco culture, but a clear recognition of the shortcomings portrayed in the above evidence is an essential preliminary to their removal. No useful purpose could be served by condoning or suppressing facts stated in friendly criticism, which are rather to be exploited to our immediate advantage. During the year 1905 Natal imported from the United Kingdom alone tobacco to the value of £64,590, while her total exports of leaf only amounted in value to £660. Our immediate object is therefore to bring to a close a period of stagnation and misdirected effort by the discussion and practical demonstration of improved and accredited systems of cultivation, curing and manufacture, and in this connection one can heartily rely upon the cordial co-operation of all interested in this interesting branch of agriculture.

A remedy has already been mooted in the shape of tobacco factories, but a visit to plantations in various districts serves to substantiate the finding of the London critics. The factory is the last word in organisation, and a first and pressing need is for modification and improvement in the preliminary steps of cultivation and curing: the employment of the best obtainable seed; the careful selection of locality and soil for specific types of leaf; the use of suitable fertilisers; and the erection of satisfactory curing-sheds. Sumatra leaf has on more than one occasion been examined which, as taken from the field, was in no way inferior in texture and conformation to wrapper imported by the growers, but afterwards ruined in the curing for lack of adequate buildings. The open grass shelter, stable or kraal is not a suitable structure for this purpose, and no real progress can be expected while curing is regarded as a simple process of drying. The regulation of temperature and atmospheric moisture is essential to the proper control of the changes which take place in the leaf during this period, and such regulation can only be effected through the medium of suitably devised sheds or barns.

THE CHOICE OF LOCALITY.

Actual field experiments can alone determine whether a given locality affords all the conditions required by a specific type of tobacco, but at the outset a rule of universal application is that good smoking leaf cannot be produced within a stated distance of the sea-coast. The "burn" of tobacco is injuriously affected by the presence of chlorides in atmosphere and soil, and as a consequence in Cuba, Sumatra, and the Philippines, areas enjoying ideal conditions for this culture, plantations are not to be found within ten miles of the sea. Good burning qualities are a characteristic of South African leaf, a single exception occurring, as quoted above, in the case of that grown within the Natal coastal belt. On the other hand, the hot, sheltered valleys, lying within from ten to fifty miles of the Coast and enjoying a copious rainfall, such as have been already exploited at Mid-Illovo, Verulam, Chaka's Kraal, and Eshowe and other districts in Zululand, would appear to offer the best available sites for the establishment of cigar-leaf plantations, while certain mid-land and up-country districts, as Weenen, Vryheid and Paulpietersburg, have secured an enviable local reputation for pipe-leaf, to be still further enhanced by the acquisition of better facilities for curing and handling. Little attention has hitherto been paid to the cultivation of cigarette types, but, subject to future correction, the results of an experimental crop at Weenen, would seem to point to this district at least as a suitable centre for the organisation of extended operations. The localisation of types carries with it many advantages, for buildings and machinery can with difficulty be adapted to the treatment of a mixed crop, and the planter's chances of success are greater when attention is devoted to the requirements and peculiarities of a single class of leaf. A reputation is likewise more easily established by the individual or district for a single line than for a collection of goods, and a better market secured for large parcels of uniform grade than for a number of small and dissimilar consignments.

THE CHOICE OF SOIL.

The current demand in South Africa is both for a lighter and milder class of pipe-leaf, which shall retain the free-burning qualities and characteristic flavour of the Boer tobacco, and for large quantities of good Turkish and Bright Virginian cigarette-leaf. A market for these types already exists, and it is obviously to the planter's advantage to follow lines of least resistance rather than to attempt to force upon the consumers products for which a demand has yet to be created. In the absence of a cheap and good substitute, heavy, coarse pipe-leaf has in the past commanded a more or less satisfactory price, but can never compete on equal terms with a superior commodity. The richer the soil, the heavier and ranker the tobacco; the heavier the tobacco, the coarser will be its character, and the less it will bring per pound. To forego a

percentage in the weight of the crop and to double its market value is true economy, and the most highly-priced tobaccos produced to-day in South Africa are almost universally grown upon sands and sandy loams by the aid of fertilisers. No method of curing or fermentation will counteract the effect of a heavy soil on the colouration of the leaf. The lemon-yellow of Bright Virginia tobacco, and the rich golden colour of the best Turkish leaf are primarily due to the soil in which the plants are grown, and are only developed by subsequent treatment. A thoroughly drained, warm sandy loam, rich, deep, and containing lime, is the most suitable for almost all classes of tobacco. The more sandy, to a certain degree, the soil is, the better will be the quality of the tobacco; the nearer the soil is to clay, the poorer will be the crop although the yield may be satisfactory. No crop is more readily affected by standing water than tobacco, and none so little affected by dry weather. Thorough natural or artificial drainage is therefore essential to satisfactory results. A sheltered position is also of the first importance, and protection against wind must be ensured, if necessary, by planting breaks of trees or even rows of maize through the plantation.

(To be continued.)

The South African Exhibition.

A LONDON VIEW.

A CORRESPONDENT sends a cutting from an English newspaper of an article on "Our Products Exhibition: its Uses and Results," by Mr. Charles Cowen, written at the close of the Exhibition.

The remembrance of the Exhibition and its effects, Mr. Cowen remarks, will be permanent, and the uses of it will begin immediately to be felt. "For, if small in compass, and very limited in variety, its sections have been excellent in quality, highly instructive to thousands of visitors, and promising of good commercial results to South Africa in general." The writer comments upon the potentialities of South Africa with an optimism that is refreshing in these times of depression and pessimistic forebodings. "Imagining that no good thing could come out of South Africa," he says, "it has been shown that, with due encouragement of its industries, and the application of money, brains, and muscle to their development, the five Colonies can be made not only self-contained, but supply the British breakfast-table with all its re-

quirements, yield fuel for all the manufacturing that Trade and Commerce demand for millions besides our own population, produce the precious metals to provide a circulating medium, and so stimulate the economies of the United Kingdom as to make the sub-continent, after all, not only a place fit to live in, but a part of the world in which capital may be safely and profitably invested."

Mr. Cowen touches a point here that does not seem to be realised in South Africa as widely as it should be. So far as food and drink is concerned, South Africa can be made to be self-supporting, for nearly all the necessities of life, and many things that must come under the category of luxuries, can be produced in this land. The veins of agriculture and commerce must be made to pulsate with new life, and in the course of a few years South Africa will take her place among the producing countries of the world.

Mr. Cowen emphasises the desirability of steadily pushing experiments with raw products which have not hitherto attracted the attention of the South African Colonies, and he thinks there can be no doubt that new developments will follow of a "highly valuable commercial nature." As an example of the way in which raw products are neglected by us, he instances berry-wax. A quantity of berry-wax was shown in the Exhibition, but from that wax not a single article made in South Africa was in evidence. "But the eminent candle and soap making firm, Messrs. Price & Co., Ltd.," he adds, "have come to the fore. They have turned this vegetable product to useful and ornamental purposes. Side by side with the crude, raw product, they display handsome groups of candles of all colours, and bars of beautiful, creamy-tinged toilet soaps." "Your readers, I know," he further states, "will open their eyes when they learn that this useful cerate is worth from £40 to £50 sterling per ton delivered on this side of the water."

It is not the old staples—wool, hides, skins, mohair, and feathers—that we have to look to for South Africa's progress, Mr. Cowen thinks, any more than to diamonds and gold. "It is first and foremost the cultivation and development of every possible product of which the soil is capable, together with the opening up of good coal and iron, by which to help ourselves to manufacture, instead of import, the implements required for our out-of-door pursuits, and our domestic comfort, that we must look, if we are to be a prosperous people."

However, the Exhibition has done South Africa a vast amount of good in many ways, Mr. Cowen concludes. That good will be more apparent yet later, and very far greater when the sub-continent, having recovered from its financial distress and its political embarrassments, stands up united as one family to promote its best interests, and win for it the position it merits in the industrial world, both as a producer of its own supplies and an exporter of requirements by other countries.

The Flora of South Africa.

1. "The Forests and Forest Flora of the Colony of the Cape of Good Hope," by Thomas R. Sim, F.L.S., F.R.H.S., Conservator of Forests, Natal, formerly District Forest Officer, King William's Town, C.C. Published under the authority of the Government of the Cape of Good Hope, 1907.

2. "Handbook to the Flora of Natal," by J. Medley Wood, Corresponding Member of the Pharmaceutical Society of Great Britain. Durban: Bennett & Davis, 1907.

In a new country, one of the most important things that requires to be accomplished is a systematic inquiry into and classification of its flora. Though a knowledge of the flora of a country is not an essential accompaniment to the successful carrying on of agriculture under ordinary conditions, it is nevertheless necessary for the student of economic agriculture and industrial crops to have at hand as much information as is available regarding the plants of his country, and the more information there is available, the more is it possible to accomplish. More broadly, the classification of a country's flora may be regarded as a part of the great web of scientific research and as a contribution to the world's knowledge of the vegetable kingdom of this planet; and, apart from any local considerations, it constitutes in itself a study of much interest and value.

Whatever South Africa may lack in other directions, she is certainly fortunate in the possession of a number of botanists. These gentlemen have from time to time, made many important contributions to the study of South African botany; and we accordingly welcome the latest works of Messrs. Medley Wood and T. R. Sim, copies of which are just to hand.

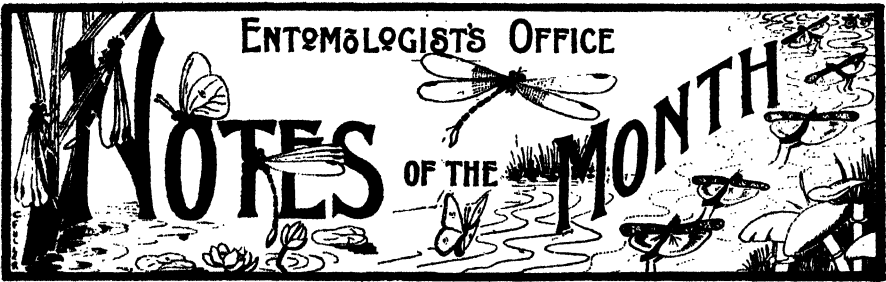
Mr. Sim needs no introduction as an author. His "Handbook of Kaffrarian Ferns," "Ferns in South Africa," "Tree-Planting in Natal," and the numerous papers from his pen which have appeared from time to time in this and other journals, have secured for him universal recognition in South Africa. His latest published work, on the forest flora of Cape Colony, is divided into three parts. Part I., on "The Forests of Cape Colony and Factors affecting them," contains descriptions of the forests of the Colony, including the area and value of the forests, their economic composition, and the economic value of Cape timbers, together with chapters on the distribution of species, factors affecting forest growth, the protection and exploitation of the forests, artificial afforesting, and an epitome of the history of Cape forestry. The second part of the work is comprised of a synoptical index to indigenous ligneous genera, an artificial key to the genera, and system-

atic descriptions of the forest flora, as well as a very useful index. Part III. contains illustrations of the species—160 plates, drawn by the author, representing 312 species. The work is published under the auspices of the Cape Government, under whom, it will be remembered, Mr. Sim served prior to taking up his present appointment; and it was for the purpose of bringing together such information as was available relating to the forest flora of the Cape Colony, to assist in the work of forest conservancy, that the present work was undertaken. Though provided with a comprehensive protective Forestry Act and a reasonable Parliamentary vote, such a small department as that in Cape Colony could hardly be expected to maintain specialists on certain branches of the science; and it was accordingly felt that a convenient and ready means of reference would be of great assistance to the officers of the department in the carrying on of their duties. The present work is the outcome; and in it the author has placed at the disposal of those for whom it was prepared a fund of information that, from its range, cannot fail to prove of the greatest value. And not only to the foresters will it prove of value. The systematic descriptions of the flora of the Cape forests, and the plates, alone give the work a value that will be readily appreciated by all interested in the botany of South Africa, and will find for it a ready place in scientific libraries. Messrs. Taylor and Henderson are also to be congratulated upon the manner in which they have executed their share in the production of the work. From a typographical point of view everything is excellent, and the lithographed plates are beautifully executed.

To Mr. J. Medley Wood's reputation as a botanist we can add nothing; he is a recognised authority on all matters pertaining to his science—and his reputation is not confined to South Africa—and the appearance of another work from his pen, a handbook of the flora of Natal, is only additional evidence of his industry. The "Handbook" is the outcome of years of study and research. In the year 1888 there was issued from the Colonial Herbarium, which was then in its infancy, a small pamphlet entitled "An Analytical Key to the Natural Orders and Genera of Natal Indigenous Plants," which, though for many years found useful, is now admittedly out of date. In 1894 there was issued from the same institution a "Preliminary Catalogue of Indigenous Natal Plants," containing the names of the plants only, with an indication of the altitudes above the sea-level at which they had been observed. "The present work is an attempt," the author says, in his preface, "to combine the two previous attempts, with such additions and corrections as longer experience and further information from outside sources has shown to be necessary." The present List includes 133 orders, 907 genera, 3,447 species; and 83 varieties, or plants not known to be specifically named. The List is now thought to be fairly complete, but any additional names which come to notice will, it is an-

nounced, appear in the Annual Reports of the Director of the Botanic Gardens and Herbarium. The Keys to Orders and genera have been completely revised, while the Key of the large Order *Gramineae* is abridged from that given in the *Flora Capensis* by omitting all genera and species which are not known to be indigenous or introduced into Natal. By means of capital letters following the names of the species, the altitude at which the plants have been found is indicated. As the distribution of the ferns is better known than that of the flowering plants, and collectors and admirers of them are more numerous, the localities are given with more precision, and the Keys to the species are also given. Farmers will be interested to know that there are 221 species of grasses recorded as indigenous, which, by the principle of the survival of the fittest, show their suitability to local conditions. The thought arises that, among all these, there are surely some to be found that would be suitable for cultivation as pure veld, to the exclusion of less useful kinds. The work is a successful attempt at a systematised classification of our knowledge of Natal plants, and is an important contribution to the study of the flora of Natal; and it may be recommended to all who desire a descriptive list of Natal plants in handy form. In addition to the descriptive lists of plants, directions are given for the drying and preparing of botanical specimens, and the work concludes with two valuable indices—one of botanical names and the other of popular names.

DESTRUCTION OF JACKALS.—Representations having been made to the Minister of Agriculture of the destruction being wrought by jackals amongst sheep in the Underberg district, the Minister has obtained the approval of the Treasury for the offering of a reward of 10s. a head for each jackal destroyed. The conditions are that the skin (which must be fresh) must be produced entire to the Magistrate, who will cut off and destroy the scalp and tail and return to the claimant of the reward the remainder of the skin. Hunting for jackals will also be allowed over the Berg lands under proper white supervision, and hunting by natives will only be allowed when such white supervision is present. It is alleged that the jackals have increased as a consequence of the Government proclaiming that portion of the Berg as a Game Reserve, but against this has to be borne in mind the fact that there is a large amount of unoccupied private land in the neighbourhood on which the jackals could breed, and the animals, being no respecter of persons, are probably also breeding in the neighbourhood of the sheep which they are constantly killing.



Paraffin Emulsion and Woolly Aphis.

THERE are few owners of apple trees who are not acquainted with woolly aphis, and many letters are addressed to this office on the subject asking for advice to enable them to combat the pest.

This would really be an easy matter if the aphis only affected the tree above the ground, as the aerial form may be economically controlled. Unfortunately, there are in Natal a number of apple trees which are not on roots resistant to the attack of woolly aphis, and it is with these that difficulty is experienced.

Many suggestions have been made for the treatment of this root-infesting form from time to time, but these, when put to the test, have in most instances been found unsatisfactory. As a result of experiments made during the years 1905-6, the use of paraffin emulsion may now be safely advocated.

Trials of this insecticide, amongst others, have been carried out at the Georgia Experiment Station, and the results are given in Bulletin 23 of that State. Experiments with tobacco dust, kainit, and carbon bisulphide yielded unsatisfactory results. It was found that the last mentioned killed the aphis over a limited area around the opening in which the liquid was placed, and that it could not be used in sufficient quantities to kill all the aphis without at the same time killing or injuring the tree. In fact, the only experiment that proved to be a direct and effective remedy which could be economically employed was the application of paraffin emulsion. The emulsion used in all the experiments against the woolly aphis was made according to the following formula:—Take: Paraffin, 2 gallons; soap, 1½ pounds; water, 1 gallon. Place a kettle containing one gallon of water over a fire, and in it dissolve the soap, which should be cut up fine. When the solution is boiling hot remove from the fire and add the paraffin. The mixture must now be agitated thoroughly. This is best done by pumping it back upon itself with a spray pump or syringe. After ten minutes' pumping

the emulsion should be perfect. The undiluted preparation is spoken of as the stock solution; and a 10 per cent. emulsion is obtained by adding 17 gallons of water, a 15 per cent. by adding 10 1-3rd gallons, and a 20 per cent. by adding 7 gallons, to the stock. For diluting it only soft water should be used, but if this is not readily obtainable hard water will be considerably improved by the addition of a little lye.

Too much care cannot be taken to secure a good emulsion. If the paraffin appears to rise to the top of the containing vessel, the mixture should be at once discarded and a fresh supply prepared. Pure paraffin will injure almost any kind of tree; and if one uses emulsion that betrays free paraffin on its surface, one might as well use the pure oil. However, the emulsion is easily made, and, if care is taken, failure need not be anticipated.

Before applying the emulsion the soil should be removed from around the base of infected trees, in a circle varying with the size of the trees. It should be two or three inches deep, or at least deep enough to partially expose the infested roots. In all cases the circle should extend at least 18 inches from all sides of the tree: and in the case of large trees, whose roots extend far out, it may have a diameter of five or six feet.

The emulsion is now applied in quantity sufficient to saturate the soil to a depth of $2\frac{1}{2}$ to 3 inches in the opening, and the soil immediately replaced to the normal level. For a circle of 3 feet in diameter three gallons of the diluted solution will suffice, and, of course, for larger trees a correspondingly greater amount of emulsion must be used.

The trees should be treated when the soil is fairly dry, if the best results are to be obtained. Further, it was found that the trees should never be treated when in a dormant condition, as, owing to the absence of running sap, injury to the tree often resulted. It may, however, be pointed out that this injury was only sustained when treating with a 40 per cent. emulsion; and the author was of the opinion that 15 per cent. would not at any time be attended with injurious consequences. In the absence of definite information on this point, it seems better to recommend that the treatment be carried out during the summer months only.

The 10 per cent. solution was found just as effective in killing the aphid as the stronger mixtures, but the odour of the latter remained in the soil for a longer period, and so acted as a deterrent. After careful observation and consideration on the subject, it was thought best to recommend the use of the 15 per cent. emulsion for treating badly infested trees. The odour of this will remain in the soil for a considerable time, and at this strength it is more economical in use than at 40 per cent.—A.E.K.



LOCUST MATTERS.

A fairly full report of the deliberations of the Inter-State Conference upon the locust question in South Africa appears elsewhere in this *Journal*. The outstanding feature of the Conference was a remarkable unanimity of opinion amongst the high official delegates regarding the necessity and the practicability of destroying locusts in the hopper stage upon the lines adopted for years past in Natal.

Conferences are so common nowadays and so much the usual thing that one is not inclined to search for anything remarkable about them, but it is doubtful whether one of a more unique nature has taken place before, because about the table were grouped official representatives of three, I might even say four, nations to discuss an insect problem.

To the people of this Colony the discussion cannot fail to be gratifying, more especially to those who from time to time have urged the desirability and practicability of dealing with locusts by concerted and co-operative measures.

LOCUSTS IN MAY AND JUNE.

With a view to ascertaining the movements and status of flying locusts throughout the Colony during the present winter, some 4,000 postcards were distributed to over 600 parties during the first week in May.

The response to these invitations to supply the department with information have so far been very satisfactory, over 120 reports having been sent in up to the date of writing, 14th June.

From the information supplied flying swarms of locusts are found to be present from the north of Zululand to the Murchison Flats. Their numbers are not by any means great, as may be judged by the fact that only 108 swarms are reported for the six weeks, and in many cases the same swarm has been reported by two or three observers.

From every part reports have been received of disease amongst the adult locusts, and it would appear that, whilst this was very virulent early in May, it has decreased in its aspect considerably since the middle of that month. From the experience gained during the past season, it now seems very obvious with regard to the fungus disease of the locust that either the disease is more virulent at the end of a wet summer, or else the adult locust is more susceptible to it than the unwinged insect.

Speaking generally, it may be said that so far the locusts have evinced no inclination to migrate. From some districts they have disappeared towards the coast or into the warmer river valleys, but this is only a local migration. In other parts they are either settled or circling

round and round the district. The information shows that up to the present they have gone south as much as they have gone north.

In some instances these winged swarms have proved mischievous, but upon the whole the Colony is not suffering particular injury from their depredations.

One of the most gratifying features of these reports is to be found in the almost complete absence of fliers from those districts in which the destruction of the hoppers was efficiently carried out by locust officers during the past season.



PEACH APHIS.

Last spring, before the coming of the rains, this insect pest did enormous damage to peach trees, covering the trees during the flowering stage, and effectively preventing the setting of the fruit. Several of my correspondents who watched their trees for the insect during the winter months, and on finding it then sprayed and destroyed them, scarcely suffered from the pest. As, at the time of writing these notes, small colonies of aphid have been found in sheltered places upon peach trees which have been free from them during the summer months, those who wish to control it are advised to keep a sharp look out for it now, and treat their trees whilst the aphides are few in number. In the spring they increase in numbers from a very few to many millions in two to three weeks, and when at their maximum are very difficult to get under control.

Spraying with non-poisonous nicotine dips, one part of dip to 60—70 parts, by measure, of water, or with tobacco and soap wash, is the most effectual means of dealing with peach aphid. Well-made paraffin emulsion is also excellent.

TOBACCO AND SOAP WASH. -

Tobacco (leaves, stems, or dust)	1 pound.
• Soap	1 ounce.
Water	3 gallons.

Boil the tobacco thoroughly in 1 gallon of water, then strain the infusion and dissolve the soap in it. Dilute this to make 3 gallons with cold water.

THUJA APHIS.

Thuja hedges are generally much affected by a large aphid at this time of the year. This aphid abounds in winter, and lives on the thuja in small colonies during summer. Affected hedges should be thoroughly hosed with water, and the aphid kept in control by spraying with paraffin emulsion. Generally speaking the aphid does not injure the hedge plant very much, but owing to the amount of honey dew which it distributes over the foliage on which grows a black fungus and to which clings every particle of dust alighting on the plant, its effect is to make the hedge most unsightly.

PLANT RESTRICTIONS.

Private individuals sending cuttings and plants to friends and others in the Colonies of the Transvaal, O.R.C., Cape, and Rhodesia are reminded that when sending these forward they must always be accompanied by the certificate demanded under the South African Inter-Colonial Plant Regulations. The forms for making out these certificates may be obtained gratis on application to this office.

PARAFFIN AND THE FRUIT FLY.

In view of the discovery in Western Australia of the remarkable attraction paraffin oil appears to have for the fruit fly which predominates in that Colony, a circular letter has been addressed from this office to many correspondents asking them to take the earliest opportunity of experimenting with paraffin for capturing adult fruit flies. All that appears necessary to do is to obtain a number of small bright tins (sardine tins, for example), and, having filled them with paraffin, hang them in the trees. At this time of the year adult fruit flies mostly frequent oranges and evergreens, and the traps should therefore be placed in them. In summer any tree the fruit of which is liable to attack should have two or three traps set in it.

It is said that the aroma of the oil attracts the flies, and in endeavouring to lap it up they become covered with it and fall into the oil. According to the *Sydney Morning Herald*, a Mr. Devenish, of Guildford, Western Australia, made this discovery, and caught 2,000 adult flies in the course of a week in his garden. Mr. G. Stranger, of Kellyville, near Sydney, New South Wales, writing to the same newspaper, says:—

“When I first heard of this method I was inclined to laugh, but nevertheless determined to test its efficiency. . . I was surprised;

on the first day, with three traps, I caught 10 flies, and since then numbers have been killed every day," Mr. Strange concludes by expressing the belief that if every fruit-grower adopted the method the pest would be brought under complete control.

MISCELLANEOUS.

Among other matters to which attention has been given are rose mildew, oak mildew, apple mildew, a fungus attacking the fibre plant, *Fourcroya*, and some physiological troubles to *Agave* and *Pinus halepensis*.

Fruit Spot of the naartje, a by no means uncommon disease, has perhaps been more in evidence this season than formerly. This superficially has every appearance of being due to fungus attack, and is characterised by the formation of small black or dark brown round spots upon the fruit. This effect, like many other diseases, seems to be due to some physiological disturbance; the spots appear to be due to the formation of "gum pockets" in the rind. The affected part gradually becomes detached around its margin from the adjoining healthy issue, and usually resembles a small plug in a hole in the fruit. The underlying cause of this trouble cannot yet be satisfactorily explained.



SUGGESTED MEALIE EXPORT TO NEW ZEALAND.—A Natalian who recently emigrated to New Zealand, writes to a relative in Natal regarding mealies grown in New Zealand. "The maize grown all over this country," he says, "is of a very inferior description—always yellow. The price now is about 20s. per muid, and I don't think it ever goes below 12s." The writer goes on to remark that Natal should be able to do a good export trade with New Zealand in mealies. We should not have much to fear in regard to Australian competition, he says; for, although that country can grow mealies, she could never, with her white labour, compete with Natal. The possibility of the establishment of an export trade in tea and wattle bark is also suggested. The correspondent in question left Natal with the avowed intention of never returning, but says he has found out that there is no place like Natal. He is rather disgusted with New Zealand, and particularly with the people there. He had his best cow stolen within a week after he had bought his stock, and the relative who sent on his communication states that no one who reads his letters would ever think of leaving Natal for a better place.

Paardeziekte.

ZIJNDE de hoofdinhoud van eene voorlezing over dit onderwerp aan het
Inanda Landbouw Genootschap.

Door H. WATKINS-PITCHFORD, F.R.C.V.S., F.R.S.E.

In de behandeling van de geschiedenis van de Zuid Afrikaansche paardeziekte kunnen wij ons niet, zooals in het geval van zulke ziekten als tuberculose of runderpest, bedienen van de waarnemingen en werken van mannen van verloopende eeuwen, daar onze vroegste ziekte-geschiedenis betrekkelijk recent is en slechts dateert van de eerste jaren der achttiende eeuw. De eerste aantekening van het bestaan der ziekte in Zuid Afrika is in 1719, toen het schijnt een uitgebreid of epizootisch karakter aangenomen te hebben en door de Kaap Kolonie gegaan te zijn, een groot aantal paarden doodende.

Het is waarschijnlijk dat de ziekte eerder bestond maar geen groote afmetingen aannam ten gevolge van de dunne bevolking van het land en de gevolgelijke afwezigheid van den onscheidbaren vriend en dienaar van den mensch, nl. het paard, dat niet schijnt in Zuid Afrika bestaan te hebben voor het uit Java ingevoerd werd omtrent 1650 door de Nederlandsche Oost Indie Compagnie.

Het vroegste documentaire bewijs dat door mij verkregen kon worden omtrent het bestaan van Paardeziekte in Zuid Afrika wordt vervat in een brief geschreven door zeker T. Moodie, van Fort Beaufort, in de Kaap Kolonie, gedateerd Maart 1856. Deze heer, waarschijnlijk reeds lang overleden, zegt in den loop van zijn brief:—

“Ik heb de Paardeziekte nooit te voren gezien doch heb er dikwijls van gehoord. In 1839 verloor mijn vader ruim 100 te Groot Van der Bosch en in 1819 heeft hij ook zeer vele verloren. In het jaar 1801, genoemd het jaar van de “groote Paardeziekte,” wordt mij verteld, werd het geheele district van paarden ontbloot en dat het bijna zoo erg was als in 1780.”

Deze brief dan, geeft ons een korten terugblik in het verleden en is des te belangrijker daar het ons de moeilijkheden toont welke de Zuid Afrikaansche paarde-boer ondervond reeds zoo lang geleden als toen George IV. op den troon zat.

Het paard is, natuurlijk, een dier nauw verwant aan den zebra (met zijn drie soorten, *Equus Chapmani*, *E. Burchelli*, en *E. Zebra*, of Kwagga, Burchell's en de gewone zebra) en Zuid Afrika is, zooals wij allen weten, van onheugelijke tijden af, het te huis van dit Paardesoort. Het lijkt derhalve niet een weinig vreemd dat een zoo nauw verwant

soort als ons makke paard een bestaan in de natuur-staat schijnlijk onmogelijk vond in dit onderdeel van het Vasteland. De wetten die de kwestie van Onvatbaarheid en Vatbaarheid beheeren lijken ons soms als heel eigenaardig, en een schijnbaar gering rassen verschil is dikwijls voldoende om de onoverkomelijke grenspaal te vormen. Wij kunnen vragen waarom de witte rat niet vatbaar is voor Miltziekte wanneer de bruine of zwarte rat het zoo makkelijk opdoet, of waarom de schapen in Algerie dezelfde ziekte zoo noodlottig voor schapen in andere deelen des aardbodems kunnen weerstaan; en vele dergelijke schijnbaar onverklaarbare vraagstukken zullen ons trotseeren op den rand van het buitengewoon ingewikkeld onderwerp van onvatbaarheid.

Hoe dit ook zij, wij vinden dat de zebra kan in localiteiten bestaan alwaar de natuurlijke voorwaarden van het bestaan voor het paard onmogelijk zijn, en toevalligerwijs is het mij vaak te binnen geschoten dat de mogelijkheid bestaat om gebruik te kunnen maken van dit natuurlijk weerstandsvermogen van den zebra in de studie van de paardeziekte.

Wanneer men de schijnlijke afwezigheid van natuurlijke hinderpalen tot de migratie van het paard uit het noordelijk deel van het vasteland (alwaar—zoo niet inheemsch—het soort bestaan heeft sedert ongekende eeuwen) bedenkt, schijnt het niet onredelijk om te veronderstellen dat de ziekte die wij kennen als Paardeziekte verantwoordelijk is voor deze uitroeiing van het wilde paard in Zuid Afrika.

Sedert den tijd van den eerst bekenden invoer van paarden door Europeanen, nu ongeveer twee honderd tachtig jaren geleden, heeft de ziekte een zwaar jaarlijksche tol van Zuid Afrika geeischt, sommige jaren was de aanval licht, andere jaren werden geheele streken van paarden ontbloot. Edington (waarschijnlijk officieele opgaven aanhalende) vermeldt een uitbreek van dezen verwoestenden vorm der ziekte in 1854 toen 64,656 paarden in de Kaap Kolonie alleen vrekten.

Van de distributie der ziekte over het geheele Afrikaansche vasteland ten zuiden van de middellijn schijnt er geen twijfel te bestaan.

Terwijl in streken om den Equator de ziekte ten alle tijden heerscht, zullen wij opmerken hoe verder zuid we komen—dat wil zeggen wanneer wij de meer gematigde luchtstreken naderen—hoe meer strekt de Paardeziekte periodiek te worden of af te breken gedurende de koele maanden van het jaar, en na wij Mashonaland en Matabeleland verlaten wordt het land verder zuid stadigerwijs al vrijer van het gevaar van Paardeziekte gedurende zekere maanden van het jaar.

Toen ik in Salisbury, Rhodesia, was, zag ik een typisch geval van Paardeziekte midden in den Winter en de heer Grey, destijds Hoofd Veearts, vertelde mij dat zoodanige gevallen geenszins buitengewoon waren. Zelfs in Natal moeten velen van zoodanige gevallen gehoord hebben (vooral in de mildere Kust streek van de Kolonie), maar door den regel genieten Natal en de Kaap Kolonie een bijna algeheele

immuuniteit gedurende zes maanden in het jaar. Inderdaad kan in algemeene termen neergelegd worden dat de Paardeziekte afhankelijk is van de *gemiddelde* temperatuur van het district. Uitzonderingen komen natuurlijk voor, doch we kunnen stoutweg zeggen dat de ziekte meer heerscht in die districten, welke, wegens hunne geografische liggingen, milder en meer sub-tropische condities van klimaat hebben.

Bovendien bestaat er overloedig bewijs omtrent het intieme verband der uitbrekingen van de ziekte tijdens of volgende op seizoenen van bijzonder veel regenval. Kust distrikten, de Tugela en Umfolosi Vallèien, moerassen en welbewaterde en wel van bosch voorziene distrikten zijn vooral onderhevig aan derzelve verwoestingen, en de toevallige uitbrekingen op het hoogveld van het Binnenland hebben een direkte betrekking tot den regenval en waarschijnlijk tot de diepte van het *ondergrond* water.

Vochtigheid en warmte zijn dus de aangenomen factoren in het veroorzaken der ziekte, of, zoo niet direkt betrokken in de veroorzaking, zijn ten minste onveranderlijk verbonden aan dien alom heerschenden epizootischen vorm der ziekte die soms onze stallen leeg maakt.

De meeste heeren zullen, meen ik, gehoord hebben, zelfs als zij het niet persoonlijk gezien hebben, van gevallen der ziekte midden in den winter en op plekken waar men haast niet kan constateeren dat de condities van warmte en vochtigheid aanwezig zijn.

Ik meen dat zoodanige gevallen zijn echt en zouden onverklaarbaar zijn ware het niet voor de kennis in recente tijden opgedaan omtrent de tijd gedurende welken de kiem der ziekte onder leden kan zijn in het gestel van een paard, evenals, als ons allen bekend is, de kiem der malaria in het menschelijk gestel voor weken en maanden onder leden kan zijn en dan plotseling in leven springen en de teekenen van koude rillingen en koorts veroorzaken.

Koude, ontblooting, uitgeputheid en andere afmattende en verzwakkende oorzaken zullen dikwijls een scherp aanval van malarische koorts in een persoon verhaasten die misschien *rele maanden te voren* het ongeluk had besmet te worden met de ziekte.

Dat de Paardeziekte kiem geen teeken van leven in het gestel van een paard voor een lang tijdperk toont, langer inderdaad dan de gewone periode van incubatie, heb ik dikwijls ontwaard in mijne proefnemingen met deze ziekte; en dit feit is des te meer belangwekkend wanneer men de gewone snelle en zekere symptomen door de ziekte veroorzaakt, als zij het gestel van het paard op de gewone wijze aantast, in aanmerking neemt.

Deze lange periode van incubatie is niet vroeger, meen ik, bespeurd en ik zal weer op dit feit wijzen, doch, zooals we zien, kan het een verband hebben met de kwestie op andere tijden dan gedurende het Paardeziekte seizoen.

Het is echter niet hierop of op eenige der meer speculatieve en

theoretische kwesties die gepaard gaan met de studie der ziekte dat ik uwe aandacht wil bepalen. Zooals gij weet heb ik in het verleden mijne opinie omtrent de oorzaak der ziekte in den vorm van officieele rapporten, enz., gegeven, en waarschijnlijk zullen de meesten min of meer over de zaak nagedacht hebben sedert zij gelezen of gehoord hebben van deze uitdrukkingen van opinie mijnerzijds.

Ik geloof dat de Zuid Afrikaansche Paardeziekte wordt verspreid voornamelijk, zoo niet uitsluitend, door middel van zuig-insekten, en de conclusie dat deze vliegen (en waarschijnlijk muskieten) zijn schijnt geoorloofd door de snelle overzetting der ziekte.

Om dit punt eerst te behandelen. Ik zal trachten kortelijks, en zoo duidelijk ik kan de mogelijke wijzen van besmetting op te noemen, waardoor te verstaan is de manier waarop de ziekte door paarden opgedaan wordt.

De gewone wijze waarop een ziekte opgedaan wordt is door aanraking of ansteking. Een heel kort overzicht der ziekte zal voldoende zijn om ons te toonen dat eenvoudige aanraking of verkeer (hoe na ook) van een ziek met een gezond paard veroorzaakt de Paardeziekte niet. Voorbeelden van deze soort van besmetting worden gevonden in runderpest, pokken, enz.

Voor ieder een geval van dieren in een stal waar dieren gelijktijdig besmet werden, kunnen er wellicht vijf honderd gevallen aangehaald worden om aan te toonen dat paarden aan weerskanten van het zieke dier volkomen gezond bleven.

Feitelijk ben ik gerechtigd dogmatisch hierover te zijn en te zeggen dat de Paardeziekte *niet overbrengbaar* is van een paard op een andere.

Tilt het paard de kiemen der ziekte dan op met zijn voedsel of water? Of ademt hij ze in het gestel wanneer hij de lucht intrekt?

Hier komen we op een meer betwistbaar gebied—een gebied dat als we allen weten goed doorloopen werd door den leek zoowel als den deskundige in de laatste drie of vier geslachten in Zuid Afrika.

Het is heel belangrijk om te wijzen op eenige veronderstellingen omtrent de oorzaak der ziekte die den Gouverneur der Kaap Kolonie in 1855 door verschillende Districts Geneesheeren, Regiments Dokters in Zuid Afrika gestationeerd, en Civile Commissarissen voorgelegd werden. Bij voorbeeld, Dokter Soek van Clanwilliam schreef dat volgens zijne meening de ziekte veroorzaakt wordt door een "schadelijke uitwasemende smetstof in de lucht die, door de paarden ingeademd, geen ontsteking of verstikking veroorzaakt, doch wanneer in het bloed en in de vertakkingen der luchtpijpen opgenomen, als een vergift werkt door het leven van het bloed te vernietigen." Het practische advies door deze schrijver gegeven als voorbehoedmiddel tegen deze ziekte is als volgt: De wilde knoflook wordt reizigers aanbevolen wanneer zij vroeg des morgens of 's avonds laat reizen, vooral aan degenen die over laagliggende vlei grond gaan—een kleine hoeveelheid van de knoflook gestampt en

in een stukje lap gebonden en dit lapje aan het gebit van het paard vastgemaakt.

De algemeene overeenstemming van opinie, professioneele en leeke, omtrent dien tijd schijnt te zijn geweest dat de smetstof in de lucht, **kwijnende vergiften, schielijke veranderingen, vergiftigde kruiden, honing dauw, slechte lucht, een drukkende lucht, enz., verantwoordelijk waren voor de ziekte**, terwijl de Staf Assistent Dorkter, van Fort Peddie schrijvende beweerde dat: "de koude is de **aanleidende oorzaak der ziekte**," eene meening die schaarsch gedeeld zal worden door hen die **langs de warme kust streek wonen**.

Bittere en klevrige dauw misten en een onverklaarbare heerschings van spinnerak draden op de weide werden door menschen in 1855 beschouwd de oorzaak te zijn van de groote uitbreking der ziekte in gemeld jaar. A. M. Bayley, die in 1856 schreef, zegt: deze webben waren buitengemeen volop overal vroeg in 1855 en dit kon niet anders dan de aandacht trekken.

Geen wonder dat te midden van zulke verbijsterende veronderstellingen en theories heeft de vrome oude boer zich achter zijn fatale filosofie verschanst en zag in de dikwijls voorkomende verwoestende epidemies van Paardeziekte slechts de kastijdende hand der Voorzienigheid.

Zooals wij gezien hebben is, volgens de algemeene overeenstemming van opinie, de ziekte niet aanstekelijk, d.w.z. zij wordt niet gevat door de nauwe aanraking van een ziek dier met gezonde paarden. Noch is zij direct besmettelijk door de kiemen der ziekte rond te strooien in kribben, paardebakken, kleeding, enz., zooals in het geval van droes. Wij zijn het allen eens, meen ik, hieromtrent en zijn gesterkt in ons ongelooft omtrent zoodanige middelen van besmetting als spinnerakken, koude tochten, schielijke weersveranderingen, enz., enz.

Er blijft, echter, o.a. nog over de mogelijkheid van de besmetting van het paard door opslukking (ingestie), of zooals wij het uitdrukken "door iets dat hij optilt of inneemt" hetzij met zijn voedsel of water, of dat hij de longen inademt.

Wij weten allen van de algemeene theorie van het verband tusschen dauw en de ziekte,—sommigen gaan zoo ver als om aan de dauw zelf de werkelijke oorzaak der ziekte toe te schrijven. Ik weet dat deze theorie zeer wijd verspreid is, inderdaad de zoogenaande dauw-theorie werd tot zeer kort geleden aangenomen door een wetenschappelijk navorscher in Zuid Afrika die, wegens zijne lange ondervinding en zijne faciliteiten, meer redenen kan aanhalen voor zijn geloof in dit opzicht dan misschien eenig ander proefnemer met deze ziekte.

De feiten ten gunste van de dauw theorie zijn kortelijks als volgt: **Practische paardekenners hebben opgelet ten eerste, dat hoe doelmatiger de stalling is hoe grooter de bescherming verleend; ten tweede, dat paarden kunnen veilig blootgesteld worden wanneer het gras omtrent droog is door verdamping van de dauw, en dat wanneer de dauw op het**

gras is, (d.w.z. gedurende den avond, nacht en vroegen morgen) is de tijd wanneer de ziekte opgedaan kan worden. Wanneer regenweer aandhoudt is er weinig dauw en weinig gevaar, benevens vele andere argumenten die zich niet onnatuurlijk leenen aan het bewijs dat de oorzaak van Paardeziekte te wijten is aan dauw. Die dauw werd verondersteld ingeademd te worden terwijl het paard in het gras en ander groen graast, of werd met het voedsel ingenomen, en dikwijls is de meening uitgedrukt, om rekenschap te kunnen geven voor de tegenwoordigheid van de microbe slechts gedurende zekere uren op den grond en het gewas, dat de dauw doet de microbe of kiem die in de lucht omzweeft vastkleven, en dit veroorzaakt de aanwezigheid daarvan op het gewas of voer dat dan gevaarlijk wordt als het met dauw belast is.

Dat zulk een proces als dit onmogelijk is, wordt getoond wanneer men de beginsels van dauw-vorming in overweging neemt, want, zooals wij weten, valt dauw niet zooals regen, maar wordt gecondenseerd of gevormd als het ware aan de werkelijke oppervlakte waarop het voorkomt, op gelijke wijze inderdaad als vocht die condenseert van onzen warmen adem op een koude glasruit. Het idee, dus, dat vallende vocht de noodlottige kiemen neerbrenghet en ze op den grond deponeren kan niet aangenomen worden. Bovendien als ze uit de lucht komen op deze wijze waarom dan worden niet alle paarden in het district schielijk en gelijktijdig aangetast?

Ik heb dauw in groote hoeveelheden bijeengebracht in het gevaarlijke seizoen uit plekken zoo gevaarlijk als ik krijgen kon en ik heb de paarden niet alleen met dauw gedrenkt, maar heb het zelfs direct in de bloedaders gezet—de zekerste manier van alle methoden om de ziekte te veroorzaken—maar mijne resultaten waren altijd, zooals ik verwachtte, geheel en al negatief. Ik meen, derhalve, dat wij heel twijfelachtig moeten zijn omtrent de dauw en ten minste geen vooroordeel moeten koesteren tegen een agent dat zoo dikwijls beschuldigd wordt tot wij verdere bewijs hebben van diens schuld of onschuld.

Wordt dan de ontwijkende en kwaadaardige oorzaak gevonden in giftige kruiden of wortels? Ik meen dat de eigenaars van groote stallen in Durban en elders zullen de mogelijkheid prompt ontkennen. Tallooze gevallen van paarden strikt op droog voer (graan en ingevoerd hooi) gevoed en die geen kruiden, groen of gedroogd, kregen zullen aangehaald worden om te bewijzen dat besmetting niets te doen heeft met giftige gewassen.

Misschien wordt het drinkwater aangetast? De getuigenis is dikwijls afgelegd dat de besmetting scheen te ontstaan wanneer de dieren naar het water genomen werden, doch niet dat eenige algemeene besmetting op deze wijze opgedaan werd, b.v. vele paarden hebben op dezelfde plek omtrent denzelfden tijd gedronken en misschien heeft slechts een de ziekte gevat; en hier mag ik aanmerken dat ik een aantal gevallen heb aangeteekend waarin paarden besmet werden die geen water kregen.

dat niet eerst gekookt en afgekoeld werd het deksel zijnde zorgvuldig op den ketel gehouden gedurende dien tijd om de mogelijkheid van besmetting van het water te beletten.

Men dacht dat de kiem rondgedragen kan zijn met luchtstroomen en door den wind en dat ze ingeademd kan worden en alzoo de besmetting veroorzaken, en op die wijze kan men de verwoestende gevallen die zoo vele slachtoffers in een slecht seizoen eischen, verklaren.

Hier, echter, is de objectie weer onoverkomelijk, want alle dieren in een stal moeten dan aangetast worden. Zoodanige condities van besmetting als bovenvermeld zijn geregeld en algemeen in hare uitwerking, terwijl de aansteking van Paardeziekte ten hoogste afwisselend en onzeker is.

Wc hebben, meen ik, voedsel, water, lucht, danw, de koude en hitte, en andere klimatische gesteldheden, benevens aandere agentschappen, hetzij gegeten, gedronken of ingeademd, van de hand gewezen.

Er blijft dan over de mogelijkheid van *inenting* of het overbrengen van de oorzaak der ziekte in het gestel door middel van een steek in het vel, voorts gebeurt in het geval van de besmetting van den os door de boschluis in rooiwater, of van de besmetting van den mensch met de malaria koorts, zoomede in vele andere gevallen van ziekte veroorzaking.

Ik vrees men kan mij beschouwen als te dralend over dit punt, doch ik wensch u al de argumenten voor te leggen die men aanhaalde ten gunste van het veroorzaken der ziekte door of door middel van eenige der mogelijke wijzen die ik u opnoemde.

Het zal misschien algemeen bekend zijn dat ik de opinie toegedaan ben dat de Paardeziekte veroorzaakt wordt door de beet van een vliegend insect, en ik werd geleid eene proefneming van deze theorie te doen van wege de verscheidene argumenten die wij aangehaald hebben.

Alle deze schijnen te kort te schieten in een of ander allerbelangrijkst bijzonderheid, en de theorie van de veroorzaking der ziekte door een insect werd mij opgedrongen net zoo zeer door het proces van *eliminatie* van andere oorzaken als door de sterke analogie of gelijkenis bestaande tusschen Paardeziekte en de malaria koorts in den mensch.

Sedert dien tijd is een nog sterker parallel ontstaan in de gele koorts van den mensch (die zulk een schrik is in de West Indies en elders), en deze ziekte werd onlangs getoond geheel te wijten te zijn aan de besmetting door een soort muskiet. In deze ziekte—de gele koorts—is de microbe der ziekte te klein om waargenomen te worden door zelfs de sterkste mikroskopen en dit is ook, zooals gy waarschijnlijk weet, waar van de Paardeziekte.

Als wij nu kortelijks de mogelijkheden in overweging nemen van het veroorzaken der ziekte in het paard door de beet van een insect zooals de muskiet, meen ik dan moeten wij allen tot de gevolgtrekking komen dat zulk een middel tot de verspreiding der ziekte waarschijnlijk is.

De bijzonderheden van een onderzoek door mij ondernomen met het doel om de werking van insecten in het veroorzaken der ziekte te bewijzen zijn waarschijnlijk bekend.

Een aantal paarden werden uit Natal genomen naar een plek die men zeide zeer doodelijk was wegens de ziekte. Het toets kamp werd in de Begamusi Vallei in Zululand geplaatst en de noodlottigheid der plek heeft de reputatie daarvan voor Paardeziekte ten volle bewezen.

Het doel was om zekere dieren in zulk een toestand te houden en te midden van zoodanige omgevingen dat, terwijl zij tegen de mogelijkheid van een aanval door insecten beschut waren, zij terzelfder tijd konden inademen welke miasme ook in de lucht vervat was, en inademen of slikken eenig besmettend dauw of voer groeiende in de nabijheid, en, feitelijk, onderworpen zijn aan condities zoo veel mogelijk gelijk aan die waarin andere paarden verkeerden, met uitzondering dat zij tegen vliegen beschermd werden.

Deze bescherming werd op twee wijzen toegepast, eerst door een licht stellage, waarvan de wanden uit platen fijn gaas netwerk (No. 32) bestonden. Door de wanden hiervan kon men het dier daarbinnen duidelijk zien en luchtstromen konden er door trekken met het grootste gemak. Het is dus niet waarschijnlijk dat kiemen, die te klein zijn om door de allersterkste mikroskoop gezien te worden en die zich een weg door de porien van de dikste porcelein filters kunnen banen, veel moeite zullen hebben om door te komen tot het toets dier onder observatie in het gaas toestel.

Ik ben tevreden dus dat behoorlijke voorziening gemaakt werd voor de mogelijkheid van atmosferische besmetting.

Twee paarden werden aan palen gebonden zoo dicht mogelijk aan dit toestel, en deze dieren die ik de "controle gevallen" of eenvoudig de "controles" noem werden onderworpen aan precies tegenovergestelde condities, d.w.z. in de afwezigheid van eenige bescherming waren zij onderworpen aan een aanval door insecten en zij kregen geen groen voer of gras van eenig soort, terwijl de grond waarop zij stonden goed gebrand en hard gemaakt werd zoo dat geen enkel grasblaadje binnen hun bereik was.

Als, derhalve, *atmosferische invloeden* betrokken waren in het veroorzaken der ziekte zouden al deze dieren gelijk besmet worden; als *gras met dauw beladen* of ander schadelijk groen voedsel betrokken was dan moest alleen het paard in het gaas toestel besmet worden; en verder, in geval men zou voorgeven dat het *drinken van natuurlijk water* de ziekte veroorzaakt werd gezorgd dat de controle dieren die droog voeder kregen niets anders dronken dan gekookt water, terwijl het paard in het gaas toestel alleen schoon spruit water kreeg.

Gij zijt waarschijnlijk bekend met het resultaat van deze proefneming—de paarden buiten het toestel kregen de ziekte en werden vervangen door andere paarden die insgelijks vrekten terwijl het paard binnen het toestel geheel gezond bleef.

De andere methode van bescherming was om de te beschermen paarden in een berookte atmosfeer te stallen. Voor dit doel werden twee rondavel stallen opgericht en tegen zon onder werden vuren van paardemeest in de deuren aangestoken om rook te maken. Gedurende den dag werden sommige der dieren toegelaten los te loopen en buiten te grazen maar werden binnen gebracht zoodra de zon wat laag begon te zinken. Vier of vijf controle paarden in de nabijheid vastgebonden bezweken het eene na het andere aan de ziekte, maar geen geval van ziekte ontstond onder de paarden gebonden in den ruwen stal waarin de lucht rookachtig gehouden werd door middel van een smeulend vuur.

Dus door een trapsgewijs proces van eliminatie hebben wij getoond dat de meeste factoren en invloeden, welke wij geleerd werden met suspicie te beschouwen, schadeloos zijn, en wij moeten erkennen dat er een mogelijkheid bestaat van een iets dat de ziekte veroorzaakt en dat niet verbonden is aan voedsel, water, wind en atmosferische invloeden, dauw of zelfs spinnerakken. He moet snel overgebracht kunnen worden, moet verbonden zijn aan een vochtigen toestand en aan de afwezigheid van zonnelicht, het moet afwezig zijn gedurende zware regens maar tegenwoordig daarna, het koude weder houdt het onder, een fijn gaas net sluit het uit en wanneer het heen en weer gaat houdt het ongewijfeld niet van een Rook Compartement. Wat anders kan hieraan beantwoorden dan een vliegend insect, ijverig tegen zon onder en zon op, gek naar vochtigheid, het licht en den zwaren regen schuwende, doch zeer werkzaam en teisterend wanneer de lucht van onze zomer klimaat benauwd drukkend en zoel is?

Dikwijls is mij tegengeworpen dat muskieten soms in groote hoeveelheden bestaan op plekken en gedurende tijden wanneer men van geen Paardeziekte hoort.

Dit is gewis het geval en de objectie is nog meer dikwijls geopperd in andere landen tegen de mogelijkheid dat de malaria in den mensch op deze wijze overgebracht kan worden. Het feit is dat een speciale soort muskieten noodig is voor de verspreiding van de malaria of gele koorts en dit kan ook bewezen worden het geval te zijn met de Paardeziekte.

Wij moeten er aan denken dat tot 150 verschillende soorten van het *Culex* geslacht of gewone muskiet zoo algemeen hier reeds beschreven zijn, en van het *Anopheles* geslacht zijn er reeds 50 soorten geassocieerd en misschien evenveel van het *Stegomyia* geslacht.

Wanneer wij indachtig zijn dat in het geval van de malaria koorts zijn er mogelijk slechts vier of vijf uit deze 50 soorten *Anopheles* betrokken, zal men inzien dat het niet iedere muskiet is die om de ooren raast of des nachts bijt, die noodwendig beschouwd moet worden als een schuldige in Paardeziekte. In deze zaak heb ik mij slechts heel weinig verdiept daar mijne handen te vol waren met andere werkzaamheden en plichten. Dus kan ik u slechts in het afgetrokkenene waarschuwen om voor de muskiet op te passen en, zooals in de Fransche

Crimineele Wet, ze allen als medeplichtig te beschouwen totdat haar onschuld duidelijk bewezen wordt.

In een vroeger rapport omtrent de ziekte, zullen de heeren zich herinneren, dat ik daarin aantoonde dat paarden in een toestel opgesloten met zekere soorten muskieten niet aangetast werden door hare beten voor er stappen genomen werden om zeker te maken dat de muskieten de besmetting ronddroegen door ze vooraf besmet paardebloed of op een ziek paard te laten zuigen.

Toen deze besmette insekten het paard binnen het toestel beten, volgde er gewoonlijk een bepaalde en ernstige temperatuur reactie zowat tien tot vijftien dagen daarna, en hoewel het paard niet vrekte, hebben de beten van slechts een paar muskieten een ernstige reeks van symptomen veroorzaakt die niet anders te verklaren zijn.

Dezelfde effecten kunnen kunstmatig geproduceerd worden in het paard door een heel kleine hoeveelheid virus van de ziekte in de maag van het dier te introduceeren of direct in de aderen door middel van een spuit te brengen. Dat het noodig is zoodanige dosis virus met de grootste voorzichtigheid toe te dienen zal ingezien worden wanneer ik u zeg dat minder dan een tienduizendste gedeelte van een kubiek centimetre van werkend paardeziekte bloed genoeg is om de ziekte te veroorzaken wanneer in de aderen van een paard gespoten.

Door het in de maag te brengen mag de dosis wat grooter zijn, en ik heb een reeks paarden met goed gevolg behandeld met allengskens toenemende dosissen virus op deze wijze, tot dat zij weerstand konden bieden zonder reactie aan een dosis bloed die groot genoeg was om verscheidene paarden niet alzoo behandeld met zekerheid te dooden.

Wij behoeven derhalve niet verbaasd te zijn om te vinden dat een noodlottig resultaat niet noodwendig op het steken van een proef-ondervindinglijk paard door een paar besmettende muskieten volgt, vooral omdat het moeielijk is om vele insekten te krijgen om weer te bijten wanneer zij reeds met bloed gevuld zijn. Het is verder mogelijk, natuurlijk, dat van de muskieten alzoo aangewend de rechte soort niet aanwezig was en dat als andere en meer geschikte soorten (tot nog toe niet bekend) besmet werden en toegang hadden tot deze paarden, zouden de gevolgen noodlottig geweest zijn.

Terwijl dit, echter, maar gissing is, blijft het feit dat zekere welbekende soorten muskieten kunnen zelfs in kleine getalen, als zij besmet zijn, een buitengewone storing van het gestel van het paard veroorzaken, en dit feit (tezamen met het feit dat paarden beschut tegen vliegende insekten ook beschermd zijn tegen de Paardeziekte) levert het sterkste veronderstelde bewijs van de juistheid der theorie dat de ziekte door de muskiet veroorzaakt wordt.

Als een practisch gevolg kan ik met alle vertrouwen de voegelijkheid op uw gemoed drukken van een of ander der middelen door mij hierboven beschreven aan te wenden. Ik meen dat de rook methode

meer bij der hand en practisch is dan om op gaas deuren en vensters te vertrouwen, doch waar het een kwestie is van kostbare paarden meen ik dat het de moeite goed zal loonen om de stallen met gaas bestand tegen muskieten te voorzien, maar men moet steeds in het geheugen houden dat even als "de sterkte eens kettings gemeten wordt dor diens zwakste schakel," even zoo zal de doelmatigheid van de gaas beschutting dikwijls afhangen van de zorg waarmede zoodanige voorzorgs-maatregelen genomen en gehandhaafd worden. Onder direct toezicht van den eigenaar zal alles goed gaan, doch wanneer men alleen met den luien kaffer of machinalen koelie te doen heeft, dan meen ik is de rook methode het beste en veiligste van de twee middels. De beste resultaten werden ondervonden met het gebruik van rook in stallen alwaar zulke voorzorgen doelmatig en ter dege genomen zijn, en groote stallen op zeer slechte plekken hebben straffe seizoenen doorgemaakt zonder een enkel verlies.

Ik heb geen slechte gevolgen bespeurd in verband met het lang opsluiten in een rook gevulden stal, en na de vuren voor eenige dagen gesmeuld hebben worden de muren, enz., inderdaad het geheel vertrek van binnen, zoo zeer doortrokken van rook dat het onverschillig is als de vuren des nachts soms per ongeluk uit gaan.

Ten slotte—kennis van deze feiten moeten, meen ik, beschouwd worden een vordering op onze kennis omtrent het voorkomen van de ziekte waar stalling te krijgen is. Een ander vraagstuk van evenveel belang, nl hoe om ongestalde paarden een weerstands vermogen tegen of immuniteit van de ziekte te geven, heeft mijn tijd nu in beslag en, hoewel ik geen bijzonderheden van dit werk nu kan opgeven, ben ik toch in staat te zeggen, zonder een onwetenschappelijk rooskleurig optimisme te herbergen, dat ik vol hoop ben dat het middel gevonden zal worden, misschien nog voor wij dit verwachten.

Als er eenige mislukking is, dat mogelijk is, zullen wij in het geheugen houden *Ars longa, vita brevis est*—de kunst is lang, het leven kort. Per slot van rekening zal de wetenschap triomfeeren, en hare schitterendste triomfen zijn dikwijls gevestigd geweest op de verleden mislukkingen harer aanbidders.

CODLIN MOTH.—By a Proclamation appearing in the *Natal Government Gazette* of the 4th June, the importation from Cape Colony, overland or by sea, of apples, pears, and quinces, has been prohibited on account of the prevalence of Codlin moth in certain parts of that Colony. This prohibition does not apply, however, to consignments from East London and Port Elizabeth.

Dippen van Beesten in Arseniet van Soda.

IN het *Landbouw Journaal* van de Kaap de Goede Hoop* voor Mei schrijft een correspondent (de heer Llewellyn J. Roberts, van Cottesbrook), betreffende het dippen van beesten in arseniet van soda. Voor hij met het stelselmatig gebruik van arseniet van soda begon, in de sterkte van 5 lbs. op 100 gallons water, 21 maanden geleden, waren er alle soorten van luizen op zijn plaats. De Bonte luis (*Amblyomma hebraeum*) en de Blauwe luis (*Rhipicephalus decoloratus*) waren het talrijkst; van de laatste waren er inderdaad zooveel dat beesten zelfs dood gingen door hun menigte van beten. Beesten die uit hoofde van deze oorzaak stierven hadden een geleachtige stof onder de huid (waarschijnlijk verdikt serum-vocht) en de huid was erg ontstoken. De heer Story, die toen proeven nam voor het Gouvernement, sneed van een kalf een stuk vel af 4 duim in 't vierkant, en telde op dit stuk 1.700 luizen. Verscheidene van de vaarzen van den heer Roberts kwamen in met haar eerste kalf zonder een enkele levende tepel om het te zoogen, wat toe te schrijven was aan de bederfveroorzakende beet van de Bonte luis. Jaren lang had hij slechts omtrent 20 percent van zijn kalvers kunnen groot brengen vanwege lever en andere ziekten.

Voor de verschijning van de bonte luis werden op deze plaats duizenden schapen gehouden, die de eigenaar moest verkoopen vanwege Hartwater toen de luizen zich vertoonden. Schapenfokkerij was daarom onmogelijk, en beesten houden was ook ondenkbaar, als het dippen geen uitkomst had gegeven.

Met uitzondering van twee maanden in den vorigen winter, zijn de beesten sedert Augustus, 1905, ieder veertien dagen gedipt. "Vandaag is het resultaat," zegt de heer Roberts, "dat de Blauwe luis volkomen uitgeroeid is, en de Bonte luis nagenoeg; het is inderdaad moeilijk er een op mijn beesten te vinden. Ik heb dit seizoen omtrent 95 percent van mijn kalvers groot gebracht en de beesten op mijn plaats zien er glanzend en vet uit en vertoonen geen nadeelige gevolgen van het geregeld dippen in arsenicum. Het doet een mensch goed de vaarzen en koeien naar de kraal te zien komen met alle vier tepels ongeschonden als in den ouden tijd."

De heer Roberts vervolgt:

"Toen hier eerst met dippen begonnen werd, werd de huid van eenige der koeien een weinig aangedaan door de hitte, maar nooit erg, en nu hebben zij er in 't geheel geen last van. Slechts een kalf is voor zoo ver ik weet door het direkt effect van het dip gestorven. Er is evenwel geen twijfel aan dat werkossen te lijden hebben als men ze kort

na het dippen laat werken, vooral als ze met zorg gefokt zijn en het weder heet is. Zij laten veel wind en als men ze niet spoedig uitspant gaan zij liggen en sterven. Ik wensch niet dat het aangenomen zal worden dat ik arsenicum als een veilig dip aanbeveel. Ik geef eenvoudig mijn ondervinding, die bestaat in het dippen van omtrent 12,000 beesten in arseniet van soda, met het direkt verlies van een kalf, en indirect verlies van twee ossen door ze te spoedig na het dippen in de heete zon te laten werken.

“De heer Kent, van Grasslands, nabij Fort Brown, deelt mij mee dat hij het dip gebruikt heeft in de verhouding van 6 lbs. op de honderd gallons gedurende verscheidene maanden zonder nadeelige resultaten, behalve dat zijn kalvers na het dippen geneigd zijn te purgeeren. Ik weet dat aan andere dipbakken nu en dan verliezen zijn geleden, vooral aan den publieken dipbak te Alice, maar het is de vraag of er in deze gevallen geen vergissing in het mengen begaan is. Ik zou eenige aanraden die Arseniet gaat gebruiken het voor de eerste een of twee malen op een zwakke sterkte te gebruiken, en de sterkte langzamerhand te vermeerderen. Dan om ook volkomen zeker te zijn dat de juiste inhoud van den dipbak bekend is, zoodat als er in den bak regen mocht vallen de hoeveelheid er aldus bijgekomen ook bekend zal zijn, of indien verdamping plaats heeft men de hoeveelheid verdampt kan weten en in aanmerking nemen.

“In het bestrijden der luizen pest zijn wij verwonderlijk gelukkig geweest, ten eerste in het bezitten van een expert gelijk den heer Lounsbury om de levensgeschiedenis van de luis te beschrijven en ons te vertellen welke ziekten ze veroorzaakt. Vervolgens in het Veeartsenij Departement door zulk een goedkoop en doeltreffend dip te ontdekken als Arseniet van Soda (het kost omtrent 1s. om 100 stuks beesten te dippen). Ten derde door dat beesten zich zoo gewillig laten dippen en er zoo weinig van te lijden hebben. (Ik vind het even gemakkelijk om een groep beesten te dippen als om ze in de kraal te jagen). En ten vierde, dat beesten de voornaamste herbergers van de luis zijn. Waren schapen de voornaamste herbergers geweest dan zou onze taak veel moeilijker geweest zijn, want zij kunnen niet zoo dikwijls in arsenicum gedipt worden als beesten, en zijn zeer lastig om te dippen. Ik zou liever 1.000 beesten dippen dan 500 schapen.

WETGEVING.

“Aangezien dippen nu de periode van proefneming doorgestaan heeft, is het tijd te overwegen of de man die zijn plaats zuiver houdt, niet op de een of andere wijze beschermd kan worden. Het is hem blijkbaar van weinig voordeel als zijn plaats, nadat hij de kosten gemaakt heeft ze van luizen te zuiveren, weer opnieuw besmet kon worden door de eerste troep beesten die zijn buurman er over brengt. Strenge wettelijke bepalingen hebben zeer vele bezwaren, maar ik denk dat er

een begin gemaakt kon worden door het onwettig te maken dat beesten van een luizengebied gebracht worden over een van luizen gezuiverde plaats, of over een waar stelselmatig dippen wordt uitgevoerd, hetzij langs een weg of anderszins, tenzij vergezeld van een certificaat van den eigenaar van een dipbak dat zoodanige beesten gedipt waren in een of ander erkend Gouvernements dip binnen 10 dagen voor zoodanig overbrengen. Zware boeten konden opgelegd worden voor het uitreiken van valsche certificaten of het overtreden dezer wet.

"Dit komt mij voor als de zachtste vorm van wetgeving die gemaakt kon worden voor de bescherming van de gezuiverde plaats, en ik meen niet dat ze zwaarder zou drukken op eenig persoon dan het bereikte doel zou rechtvaardigen. Degelijke besprenkeling zou als alternatief van dippen gesteld kunnen worden, en besprenkeling met paraffine zou de moeilijkheid uit den weg ruimen dat werkossen te lijden zouden hebben door de behandeling met arsenicum. Ik vrees dat, als strenger maatregelen, zooals verplicht dippen in de door luizen besmette streken, voorgesteld worden, er meer vijanden dan vrienden van de zaak zouden komen."

The Show Season.

ROYAL AGRICULTURAL SOCIETY'S SHOW.

THE month of June has been characterised by the number of agricultural shows which have been held, under the auspices of the different associations scattered over the Colony. Generally speaking, the show season has been a successful one, but the absence of the chief feature at all our agricultural shows, the cattle section, has created a void in most of the shows that have been held. Other sections have, however, on the whole been excellent, particularly the produce shown; and if they have done no other good they have shown to pessimists what Natal could do if she would set her mind to it.

Foremost among the shows was, of course, that held by the Royal Agricultural Society of Natal in Maritzburg on the 13th, 14th, and 15th June. In this show the live stock sections, with the exception of that of dogs, were well represented, and contained some fine animals. The farm produce sections also contained some noteworthy exhibits, some of the samples of mealies and potatoes shown being surprisingly good. In the fruit sections there were some good exhibits of citrus

fruits; but pineapples—probably on account of the hailstorms which have in many cases done much damage to the plantations—were not well represented.

One of the most interesting features of the Show was the Exhibition of Colonial Industries. Tea, sugar and golden syrup, tobacco and cigars, biscuits, sweets and other confectionery, soaps, jams and bottled fruits, honey, and syrups, besides the leather, furniture, and other industries, were all well represented by good samples. Mr. Kirkman's exhibit of cotton was of special interest, and gave a good indication of the Colony's possibilities in that fibre.

A splendid machinery section covered a large area of the grounds, and afforded ample evidence of the strides that are being taken in agricultural mechanics. The wagons exhibited by Messrs. Merryweather were a striking sample of Natal industry.

The Show was well patronised by the general public, and continued to uphold its claim to be one of the chief winter events in the City.

It is hoped in the next issue of the *Journal* to publish some photos taken at the Show.

Space does not allow of mention being made of other of the several shows that have been held lately, except to say that they have, on the whole, been successful; and that, despite the forced absence of a large number of entries comprising the cattle section, the associations concerned have every reason to be satisfied with the results of their shows.

Estimates of Crops.

UNFORTUNATELY sufficient data have not been received to enable the crop estimates published in last month's *Journal* to be revised. It may be stated, however, that, as regards mealies, the first batch of reports received from honorary crop correspondents tend, on the whole, to show that the crop will not be quite as large as estimated last month (903,000 muids). The difference, however, will not interfere with the prospects of a successful export being undertaken.

By a printer's error on page 530 of last month's *Journal*, on the last line, the statement was made that the total crop of mealies, *including natives' crops*, would be just under a million muids. The word "including" was a printer's error, and should have been "excluding," no account having been taken of natives' or of Indians' crops in the estimates which have been made by the Department.

Mealie Export.

THE OVERSEAS MARKET.

THE following information regarding the position of the maize market on 31st May has been compiled from *J. E. Beerbohm's Evening Corn Trade List*.

The imports of mealies into the United Kingdom during the previous week were 231,500 quarters (617,333 muids), against 279,700 quarters (745,866 muids) the week before, and 99,900 quarters (266,400 muids) the corresponding week of last year. The world's shipments were 450,000 quarters (1,200,000 muids), of which 215,000 quarters (573,333 muids) were for the United Kingdom and "for orders." During the past five weeks the average shipments to the United Kingdom have been 235,000 quarters (626,666 muids), and for the Continent 250,000 quarters (666,666 muids), per week, so that the absence of La Plata corn has, so far, not been much felt, owing to the liberal movement from South-Eastern Europe; and if the United Kingdom's requirements were only normal, viz., 200,000 quarters (533,333 muids) per week, the supplies would have been excessive; the consumptive demand is, however, no doubt quite abnormal this season, because maize has remained by far the cheapest food stuff, a factor which no doubt will operate in favour of maintaining a fairly high price for maize, which also moves, to some extent, in sympathy with wheat.

It is interesting to compare the shipments to Europe since November 1st. (the beginning of the maize season) for the past few years.

This is done in the following statement, which is also taken from *Beerbohm's List*:—

MAIZE SHIPMENTS TO EUROPE.

	29 weeks since Nov. 1.		
	American, Qrs.	Others, Qrs.	Total, Qrs.
1906/07	6,050,000	7,150,000	13,200,000
1905/06	9,950,000	4,450,000	14,400,000
1904/05	7,700,000	5,300,000	13,000,000
1903/04	3,475,000	8,350,000	11,865,000
1902/03	7,025,000	4,075,000	11,100,000

The weekly averages for the United Kingdom and the Continent separately compare as follows:—

	To U.K. Qrs.	To Continent, Qrs.	Total, Qrs.
1906/07	205,000	250,000	455,000
1905/06	205,000	292,000	497,000
1904/05	190,000	260,000	450,000
1903/04	200,000	195,000	395,000
1902/03	205,000	165,000	370,000

A noticeable feature here shown is the steady level of about 200,000 quarters per week which the United Kingdom's requirements have maintained. The largest shipment on recent record was in 1901/02, when for the above period 16,250,000 quarters were shipped, 12,200,000 quarters being from America, and when the United Kingdom received about 250,000 quarters per week, and Continental countries 290,000 quarters per week.

Our cable (says *Beerbohm's List*) from Buenos Ayres reports that the new maize was still arriving in irregular and defective condition. Shipments remain quite small.

The general statistical position of maize carried up to date is as follows:—

	1907—qrs.	1906—qrs.	1905—qrs.
On passage to United Kingdom ..	610,000	920,000	750,000
On passage to Continent	565,000	995,000	460,000
Imports into United Kingdom for the 21 weeks ending May 25th	4,611,600	4,290,000	4,375,000
Visible supply in United States .. (<i>Bradstreet's</i>)	1,308,300	701,900	980,700

	1906-7.	1905-6	1904-5
American crop	340,000,000	316,000,000	285,000,000

	1907.	1906.	1905
New York, Spot	62½c	58c	57½c
Mark Lane, Mix. Am. ex-ship ..	23½	22½	22½

SHIPMENTS OF MAIZE TO EUROPE FROM JAN. 1 TO DATE.

	1907. U.K.*	1907. Cont.	1906. U.K.*	1906. Cont.	1905. U.K.*	1905. Cont.
	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.
America	2,417,000	2,580,000	3,007,000	4,742,000	2,915,000	4,164,000
Argentina	505,000	407,000	1,218,000	853,000	988,000	833,000
Russia	675,000	855,000	75,000	108,000	128,000	269,000
Danube, etc. ...	653,000	818,000	130,000	412,000	109,000	124,000
Total	4,250,000	4,660,000	4,430,000	6,115,000	4,140,000	5,390,000

* Includes shipments for orders.

In the grain sales reported during the week ended May 30th, the average price for cargoes due to arrive on Monday 24th was about 24s. per quarter (equivalent to 9s. per muid), and for cargoes to arrive May 25th, about 24s. 6d. (equivalent to about 9s. 3d. per muid).

NATAL MEALIE CROP.

From the reports which have up to the present been received from our honorary correspondents, there would not appear to be prospects of such a heavy crop as was at first anticipated. The heavy rains have in many cases destroyed the prospects of a heavy yield; but on the whole a very good crop may be expected. The indications seem to point to a much heavier yield on and near the coast than further inland, though most of the inland districts promise to be considerably above the average.

The average prices for the month ending 15th June were: Maritzburg, 7s. 6d., and Durban, 8s.

PREPARATIONS FOR EXPORT.

Arrangements for the placing of our mealies upon the London market are now far advanced. The Agent-General is to receive for the time being all consignments; and he will dispose of them to the best possible advantage. This plan is considered preferable to that of consigning the grain to any one broker in London, and Sir William Arbuckle's opinion in this matter has been confirmed by the experience of the Cape.

As regards the actual shipping of mealies, the Agent-General states that the usual practice in the Corn Market in England is to bag the grain in what are known as "half-sacks," containing 120 lbs. each. This is thought to be a far more convenient method as regards handling than sending it forward in 200 lb. sacks, which are considered too unwieldy. In a letter to the Agent-General, Messrs. Dewar & Webb, Exchange Chambers, St. Mary Axe, state that shipment in bags is preferable to shipment in bulk, as the grain usually arrives in better condition. "Special care," they continue, "must be taken to see that only sound grain is shipped. By sound grain, we mean grain which has been fully matured before cutting, and which has been harvested in dry weather. Maize which is cut green, or which is shipped damp, is certain to arrive out of condition, as the grain is a very tender one and easily discoloured by a voyage Home through the tropics. Regarding stowage, it ought not to be stored near the boilers, and the ship-owners should have special instructions regarding the ventilation. As there is so little return cargo from South Africa, there ought to be no difficulty regarding the stowage and ventilation. Attention must also be given to see that no cargo is stowed on the top of the maize which will prevent the escape of any sweat which may arise on the voyage." The special attention of intending exporters is called to the first portion of the above extract. Too much care cannot be bestowed upon the condition of the grain and its bagging. It is only by attention to details that a really successful

export in any particular product can be organised and prosecuted. As a great deal depends upon this first shipment of mealies, the Department is anxious that nothing but sound mealies are exported.

Those who intend taking advantage of the Government offer are requested to immediately send in samples of about 10 lbs. in weight of the mealies they intend to forward. The samples should not consist of specially picked mealies, but should be taken promiscuously, and should represent a fair average of the crop.

It was thought at first that the mealies would only come under one grade, but it is obviously unfair to classify the mealie grown up-country with that produced on the coast under one grade. The Minister of Agriculture is obtaining samples of mealies from all over the country, and upon their receipt the matter of grading will be gone into.

Grenadillas in London.

"NO DEMAND."

EARLY in April Mrs. Joseph Baynes, of Nel's Rust, very kindly placed at the disposal of the Department of Agriculture 20 cases of grenadillas for the purpose of an experimental export to England, and later supplied a further 20 cases. These two lots were carefully packed, and consigned, per "Kenilworth Castle" and "Armadale Castle," to the Agent-General for Natal in London.

With regard to the first consignment, Sir William Arbuckle reports that nearly all the grenadillas were shrivelled and many of them were mouldy. It appeared to him, therefore, that nothing better could be done than to send them to market. The 20 cases were accordingly sent to Messrs. George Monro, Ltd., one of the largest firms of fruit-brokers in Covent Garden. On seeing the fruit, Mr. George Monro expressed the opinion that it was valueless and probably would not sell. The fruit was shown for sale, but not a single offer was made for it. The 20 boxes were then handed over to Messrs. Garcia, Jacobs & Co., of Covent Garden, for them to be sold by auction, but not a bid was made.

Reporting upon the second consignment, the Agent-General states that the condition of the fruit was very unsatisfactory. Some of the boxes are, however, being sold privately, though they are unsaleable in a business way. Some of the fruit has also been sent to the leading hotels, with a request for a report upon the way they are received in London.

The Agent-General has made extensive enquiries, and finds that there is no market in London for grenadillas. Some few cases come from

Madeira and the Canary Islands, and although the fruit is twice the size of that from Natal and arrives in a perfectly smooth condition, green and ripening to a beautiful yellow similar to the colour of a loquat, there is no large demand for the fruit. "It is evident," says Sir William Arbuckle, "that grenadillas are but little known in London, and I do not think there is any prospect of Natal finding a profitable market for them here." In a letter from Messrs. Monro, Ltd., to the Agent-General, the writer says: "You say they (*i.e.*, the grenadillas) are in splendid condition. That may be so from a Natal point of view, but they are not likely to sell well as the appearance is so much with the London trade, and these are quite shrivelled."

That it was not merely the shrivelled appearance of the fruit that told against them is proved by the fact that, whilst our grenadillas were in the hands of Messrs. Monro, Ltd., a gentleman came there with some grenadillas which he had brought with him from Melbourne to test the London market. His fruit had been separately wrapped in paper and placed in tins holding about ten dozen, the tins being afterwards filled with cork dust and hermetically sealed. The fruit were purple in appearance and smooth. Of the 30 dozen fruit he bought, only a few selected ones fetched as much as one shilling per dozen. He has decided that London offers no market for grenadillas; and Messrs. Monro, Ltd., Garcia, Jacobs & Co., and others strongly affirm, the Agent-General says, that there is no demand in England for the fruit.

It is evident from this correspondence that the British public has not yet been educated up to the taste of grenadillas. It might be feasible to supply the London market with grenadilla juice and pulp extracted and bottled prior to shipment. When the public has become used to this extract, a demand might arise for the fruit complete.

East Coast Fever.

REGULATIONS FOR APPOINTMENT OF ADVISORY COMMITTEES.

THE following Regulations for the appointment of Advisory Committees under the East Coast Fever Act, 1906, have been approved by His Excellency the Governor in Council:—

1. In each Magisterial Division declared an infected area in terms of Section 3 of Act No. 54, 1906, there shall be appointed a committee consisting of eight members, six of whom shall be elected at an annual public meeting called for that purpose by the Magistrate of the Division.

At least fourteen days' notice shall be given in the *Government*

Gazette, and a copy of such notice shall be posted on the notice board of the Magistrate's Office, and on other public buildings, and shall also be handed to the police for exhibition to the farmers in their usual patfols.

2. In the event of more than six nominations being submitted the election for members of the committee shall be by ballot.

3. The District Veterinary Surgeon and Stock Inspector of the district shall be *ex officio* members of the committee.

4. The committee shall appoint its own chairman.

5. In the event of any difference of opinion amongst the members of the committee, the majority shall decide.

6. Three members shall form a quorum.

7. The duties of the committee will be (a) to consider and decide upon any application which may be submitted to them by the Principal Veterinary Surgeon to bring cattle into the district from other districts; (b) to issue permits as individual members of the committee for the movement of cattle within their districts where such movement is permitted by the Minister of Agriculture; and (c) generally to advise and assist the Minister of Agriculture in all matters arising out of the Act.

8. The committee shall meet at least once a month, but the chairman may at any time call together the members of the committee for the purpose of discussing any matters or questions connected with East Coast Fever which it may be wished to place before the Government, and the Government may at any time summon, through the District Veterinary Surgeon or Stock Inspector, a special meeting of the committee for similar purposes.

9. All recommendations or suggestions of the committee shall be forwarded to the Government through the local District Veterinary Surgeon or Stock Inspector.

10. The Minister shall have power to remove from committees any members who fail to attend three consecutive meetings of the committee, or who act contrary to the powers granted to them under these Regulations.

11. Members of committee will not be entitled to any remuneration for their services.

12. Any vacancies occurring on such committee during the year shall be filled up by the remaining members of the committee, subject to the approval of the Minister.

13. The District Veterinary Surgeon or District Stock Inspector shall make and preserve correct minutes of all proceedings of the committee, and all such minutes shall be submitted for confirmation at the meeting next succeeding to that to which they refer. Such minutes shall be recorded in a book kept for that purpose, and shall contain the names of all members present at each meeting.

Experiment Farms.

CENTRAL EXPERIMENTAL FARM, CEDARA.

FARM MANAGER'S REPORT.

To DIRECTOR EXPERIMENT STATIONS.—

The work done on the various branches of the Farm during the past month has been varied and the average progress made.

Considering that the season's rains, which continued rather later than usual, have now ceased, slight interruption only was caused to outdoor work—harvesting in particular. Approximately three-quarters of an inch was the rainfall recorded for the month; and, of that 45 points were registered in one day. The rainfall, dating from the 1st July, 1906, is now 50 inches. This is about 20 inches over the average of the past few years, the result of which, it is to be hoped, will be the means of encouraging the growth for an early spring. On the 28th of the month the first frost of the season was experienced: the thermometer then, and on five consecutive dates, registered 26 degrees Fah. The Farm has now assumed a very wintry aspect, the veld is completely brown, and the grass dried off; and the sudden change has affected the working cattle very much and brought them down in condition. They are now being fed with shredded mealie stalks (stover) and hay. Several of the oxen had an attack of "three days' sickness," which has been so prevalent this season. They have now quite recovered.

A commencement has now been made with poultry farming, and pens of Buff Orpingtons, Silver Wyandottes, and White Leghorns have already been secured.

Grass-cutting for hay has been completed, and all has been stacked, but probably some further cutting will be necessary to secure a bedding stock. A small stock of millet hay was built, in addition to the portion ensilaged, and the former fodder is being greedily eaten by all stock. The maize crop has been cut with the McCormick Harvester and Binder, which worked very well considering the tangled and broken-down condition of the crop caused by the hail. Potatoes were harvested on the vlei; the results are being tabulated, and will be submitted when complete. A large consignment of the season's crop has been placed in the Maritzburg Government Cold Stores; and, as several enquiries have been made at this office of late regarding the condition of potatoes treated in cold stores when required for planting, I wish to state that previous experience proved highly satisfactory when the consignment

had been treated with a uniform temperature of 40 degrees Fah. Several varieties of wheat were planted on vlei ground early in May, all of which have made a good start; particulars of the most suitable varieties will, however, have to be stated at a later date. The Right Hon. F. R. Moor, when in England, secured a consignment of "Standard Fife" wheat for distribution to Natal farmers, and this has been received. It is now too late for planting this season.

Attention has been given to the hoeing and burning of fire-breaks, particularly on the forestry areas, and drain-cutting has also been in hand. Barley, rye, and wheat have been scarified with anti-clog weeders and zig-zag harrows; and root crops have been scarified with scufflers.

The breaking up of one of the pasture paddocks is in hand with a view to having it prepared and planted out with different varieties of grasses. The cattle have been periodically dipped, and advantage is taken by many farmers in the district of the opportunity to have their cattle brought to the Farm dip.

The windmill and piping have been removed from the old site to be erected for further use on the truck farm, in conjunction with which a reservoir is also being built.

The Engineer and Carpenter have each been fully employed on their respective branches of work, and give very satisfactory reports of the progress and attention that is being shown by the students in their work. This applies equally to the field work.

ALEXANDER REID.

Farm Manager.

DAIRYING WORK.

THE Dairy Instructor (Mr. Laurence) reports to the Director of Experiment Stations that, acting upon instructions received from him, the first of a series of feeding experiments has been taken in hand with the object of ascertaining the effect of different rations on the quantity and quality of milk, and upon the weight of the animals fed. Six rations are being used, two cows being fed with each. The twelve cows employed have been carefully weighed and a composite sample of their milk taken and tested preparatory to the test. This will be done every week, and a careful record of the milk will be kept. The following table shows the several rations which will be fed. The present series comprises a uniform roughage ration and a series of concentrate rations. Cows are to be fed for a preliminary period of seven days, and for a further period of 14 days, during which latter period results will be deduced. No doubt some very valuable information will be obtained from these tests.

Cows.	Rations.	
1 and 2	Grass Hay, 10 lbs. Sliced Turnips, 20 lbs.	Maize Meal, 6 lbs.
3 and 4	Grass Hay, 10 lbs. Sliced Turnips, 20 lbs.	Maize Meal, 4 lbs. Wheaten Bran, 2 lbs.
5 and 6	Grass Hay, 10 lbs. Sliced Turnips, 20 lbs.	Munga and Bulbush Millet Meal, 6 lbs.
7 and 8	Grass Hay, 10 lbs. Sliced Turnips, 20 lbs.	Maize Meal, 4 lbs. Brewer's Grain, 2 lbs.
9 and 10	Grass Hay, 10 lbs. Sliced Turnips, 20 lbs.	Maize Meal, 4 lbs. Cokernut Cake, 2 lbs.
11 and 12	Grass Hay, 10 lbs. Sliced Turnips, 20 lbs.	Maize Meal, 4 lbs. Ground Nut Cake, 2 lbs.

The six pupils entered for the Butter Making Competition at the Royal Agricultural Show, Maritzburg, acquitted themselves with great credit, taking all the earlier places on the list. This being the first time any of them had appeared in public they were perhaps a little nervous, but this was only to be expected in the circumstances. The judge has promised to send a report and list of marks given, which should enable the Instructor to point out to each his weak points. The following were the prize-winners:—

1, G. McFie; 2, E. M. Smythe; H.C., E. O. Mapstone; C., J. A. Raw.

From observations of his own the Instructor noticed they all churned a trifle slowly, and, in one case, a little too much, which latter resulted in a rather too large grain, while all but two worked their butter rather much in the worker.

The cream seemed rather obstinate in breaking, which made the time taken rather long. The judge seemed very pleased with the work done, and made special reference to the making up and printing, which was extremely well and neatly done.

SCHOOL OF AGRICULTURE.

As mentioned in the Housemaster's report in the last issue of the *Journal*, at Easter two examinations were held, one on the "Principles of Agriculture" and one on the "Management of Stock." The following were the papers set to the students:—

PRINCIPLES OF AGRICULTURE.

NOTE.—Not more than four questions to be answered in either section.

A.—Farm Drainage.

1. In what way does the surplus water of undrained soil affect the growth of field crops?
2. Give a brief account of water circulation in the soil, and show how this is influenced by the character of soil.
3. "Surplus moisture must be removed down through the soil and not over its surface." Support this statement by detailing the advantages offered by subsoil drains.
4. In what cases would open drains be employed in preference to subsoil drains? What cross section and fall would you adopt when cutting open drains?
5. Enumerate some forms of subsoil drains and discuss their relative merits.
6. (a) "The deepest drains flow first and longest"; (b) "There should be no down-hill side to a tile drain." Explain by means of text and diagrams.
7. Give arguments for and against deep-draining.

B.—Irrigation Farming.

1. (a) "Irrigation is a higher and more scientific industry than rain-farming"; (b) "Drainage forms the complement of irrigation." Explain.
2. Enumerate some of the advantages derived from irrigation.
3. Define the terms (1) "duty of water"; (2) "cusec"; (3) "catchment area."
4. Estimate the dangers of over-irrigation, and quote principles by which you would be guided when employing irrigation water.
5. What requirement would you have in view when selecting a site for a storage dam?
6. What objects are served by a puddle-trench, and how would you construct same as an element in an earthen dam?
7. What embankment materials would you select for the construction of an earthen dam, and how would you employ these?

MANAGEMENT OF STOCK.

NOTE.—Answers should be given to eight questions only.

1. Classify the substances present in any stock food, and explain the term "nutritive ration."
2. Fats have a higher feeding value than starches or sugars, and protein than fats. To what are these additional values due?
3. In what respects should a winter-ration for a cow in milk differ from that fed to a fattening steer?
4. How would you determine the actual feeding value of any given mixed ration? What do you understand by a "properly balanced" ration?

5. Describe any peculiarities observed in the stomach of the horse and rules for feeding based thereon.

6. To what causes may colic in horses be attributed?

7. Quote suitable rations for:—(a) Heavy horse; (b) racehorse; (c) trek mule; (d) cow in milk; (e) dry cow; (f) fattening steer; (g) ewe in lamb; (h) fattening lamb.

8. Estimate the importance of legumes, as hay and grain, in any mixed ration.

9. Describe the ruminant stomach.

10. What advantages accrue to the feeder from the use of improved or pure-bred butcher's stock?

11. What systems would you adopt respectively for feeding:—(a) Calves for beef?; (b) calves for the dairy?

12. Draw up a table showing quantities of full and fortified skim-milk to be fed to dairy calves from birth until placed on solid food?

13. What precautions should be observed when feeding skim-milk to calves? How would you fortify this to secure best results?

14. Instance methods adopted in feeding for veal.

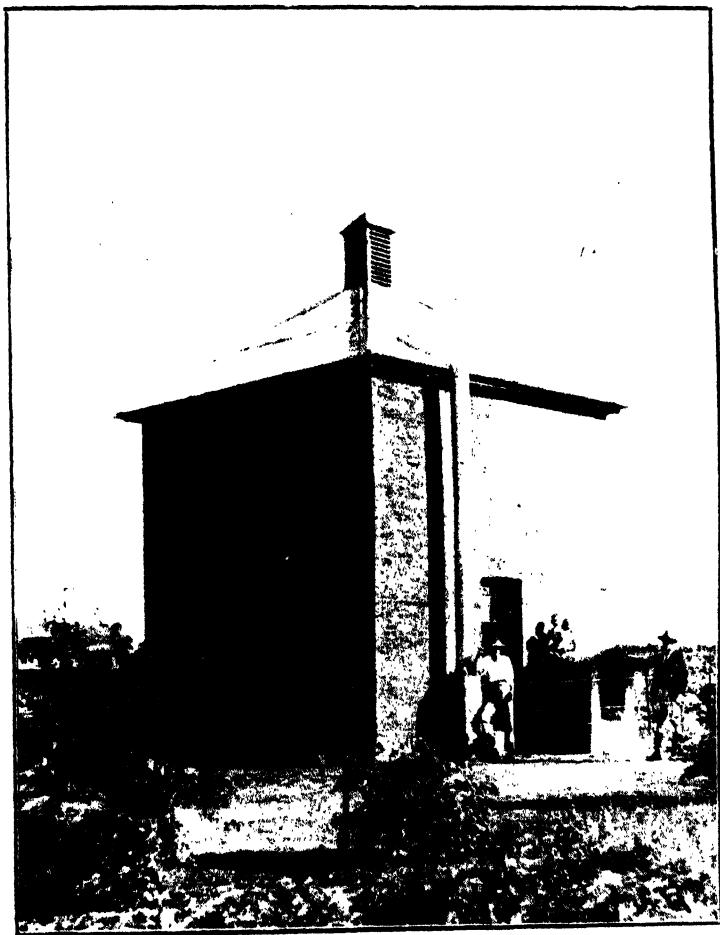
WINKEL SPRUIT.

TO DIRECTOR EXPERIMENT STATIONS.—

The three varieties of barley which you sent from Cedara were planted early in May and are making good growth.

Over 2,000 celery plants were transplanted from nursery beds into trenches cut 10 inches deep and filled in with 3 inches each of well-rotted kraal manure and fine black loam. These plants require a lot of moisture, and, as there is an abundant supply of water to be had from the spring at the end of the trenches, there is not much difficulty in keeping them well supplied. Almost all the plants are looking healthy.

The principal work for the month has been the harvesting of the Maize Distance of Planting section. From this alone 96 different results have been tabulated, which show yields ranging from 5 to 24 muids to the acre. There were four plots in the section, and each plot had 12 pairs of rows, one of each pair being detasseled in the early stages of its growth. This detasseling led to a marked increase in the yields from the Plots A and B, where the rows are 6 and 5 feet apart respectively, but does not appear to have had the same effect in Plots C and D, where the rows are 4 and 3 feet apart. Best results were obtained from Plot A, where the rows were 6 feet apart, three plants grown at each spacing and the spacings 12 to 30 inches apart. Following are the results tabulated from the whole section:—



FLUE CURING TOBACCO BARN.

AT WEENEN EXPERIMENT STATION.

Erected for Treatment of Settlers' Leaf, and especially adapted to
Bright Virginian, Turkish and light pipe leaf.

MAIZE EXPERIMENTS (DISTANCE OF PLANTING), 1907.

PLOT A.—Six Feet Between the Rows. Rows 150 Feet Long.

No. of Rows.	Distance between Plants.	No. of Plants.	Yield in Ears.	Yield in Grain.	Grain per Acre.
	Inches.		lbs.	lbs.	lbs. equal to muids.
1 ...	6	One	57	38	1,839 .. 9'39
2 Detasseled ...	6	"	55	37	1,791 .. 8'191
3 ...	8	"	62	42	2,033 .. 10'33
4 Detasseled ...	8	"	77	52	2,517 .. 12'117
5 ...	10	"	58	39	1,887 .. 9'87
6 Detasseled ...	10	"	67	45	2,178 .. 10'178
7 ...	12	"	72	48	2,323 .. 11'123
8 Detasseled ...	12	"	77	52	2,517 .. 12'117
9 ...	12	Three	107	72	3,496 .. 17'96
10 Detasseled ...	12	"	119	80	4,094 .. 20'94
11 ...	18	"	111	74	3,581 .. 17'181
12 Detasseled ...	18	"	113	76	3,678 .. 18'78
13 ...	24	"	102	68	3,291 .. 16'91
14 Detasseled ...	24	"	101	68	3,291 .. 16'91
15 ...	30	"	80	54	2,613 .. 13'13
16 Detasseled ...	30	"	85	57	2,662 .. 13'62
17 ...	36	"	66	44	2,120 .. 10'129
18 Detasseled ...	36	"	73	49	2,371 .. 11'171
19 ...	24	Four	99	66	3,194 .. 15'194
20 Detasseled ...	24	"	94	63	3,040 .. 15'49
21 ...	36	"	58	39	1,887 .. 9'87
22 Detasseled ...	36	"	62	42	2,033 .. 10'33
23 ...	48	"	48	32	1,549 .. 7'149
24 Detasseled ...	48	"	45	30	1,452 .. 7'52

PLOT B.—Five Feet Between the Rows. Rows 150 Feet Long.

No. of Rows.	Distance between Plants.	No. of Plants.	Yield in Ears.	Yield in Grain.	Grain per Acre.
	Inches.		lbs.	lbs.	lbs. equal to muids.
1 ...	6	One	73	49	2,846 .. 14'46
2 Detasseled ...	6	"	77	52	3,020 .. 15'20
3 ...	8	"	53	36	2,091 .. 10'91
4 Detasseled ...	8	"	65	44	2,556 .. 12'156
5 ...	10	"	60	40	2,323 .. 11'123
6 Detasseled ...	10	"	55	37	2,151 .. 10'151
7 ...	12	"	49	33	1,917 .. 9'117
8 Detasseled ...	12	"	46	31	1,801 .. 9'1
9 ...	12	Three	64	43	2,498 .. 12'98
10 Detasseled ...	12	"	72	48	2,788 .. 13'188
11 ...	18	"	76	51	2,963 .. 14'163
12 Detasseled ...	18	"	79	53	3,078 .. 15'78
13 ...	24	"	62	42	2,439 .. 12'39
14 Detasseled ...	24	"	60	40	2,323 .. 11'123
15 ...	30	"	55	37	2,151 .. 10'151
16 Detasseled ...	30	"	56	38	2,206 .. 11'6
17 ...	36	"	53	35	2,033 .. 10'33
18 Detasseled ...	36	"	51	34	1,975 .. 9'175
19 ...	24	Four	64	43	2,498 .. 12'98
20 Detasseled ...	24	"	62	42	2,439 .. 12'39
21 ...	36	"	43	29	1,685 .. 8'85
22 Detasseled ...	36	"	43	29	1,685 .. 8'85
23 ...	48	"	38	26	1,511 .. 7'111
24 Detasseled ...	48	"	30	20	1,162 .. 5'162

PLOT C.—Four Feet Between the Rows.

No. of Rows.	Distance between Plants.	No. of Plants	Yield in Ears.	Yield in Grain.	Grain per Acre.
	Inches.		lbs.	lbs.	lbs. equal to muids.
1 ...	6	One	57	38	2.759 .. 13'159
2 Detasseled ...	6	"	50	33	2.396 .. 11'106
3 ...	8	"	46	31	2.250 .. 11'50
4 Detasseled ...	8	"	48	32	2.323 .. 11'123
5 ...	10	"	49	33	2.396 .. 11'106
6 Detasseled ...	10	"	45	30	2.178 .. 10'178
7 ...	12	"	46	31	2.250 .. 11'50
8 Detasseled ...	12	"	42	28	2.033 .. 10'33
9 ...	12	Three	44	30	2.178 .. 10'178
10 Detasseled ...	12	"	49	33	2.396 .. 11'106
11 ...	18	"	52	35	2.541 .. 12'141
12 Detasseled ...	18	"	53	36	2.614 .. 13'14
13 ...	24	"	44	30	2.178 .. 10'178
14 Detasseled ...	24	"	54	36	2.614 .. 13'14
15 ...	30	"	43	29	2.105 .. 10'105
16 Detasseled ...	30	"	44	30	2.178 .. 10'178
17 ...	36	"	44	30	2.178 .. 10'178
18 Detasseled ...	36	"	50	33	2.396 .. 11'106
19 ...	24	Four	62	41	2.976 .. 14'176
20 Detasseled ...	24	"	51	34	2.468 .. 12'68
21 ...	36	"	51	34	2.468 .. 12'68
22 Detasseled ...	36	"	65	43	3.121 .. 15'121
23 ...	48	"	44	30	2.178 .. 10'178
24 Detasseled ...	48	"	47	32	2.323 .. 11'123

PLOT D.—Three Feet Between the Rows.

No. of Rows.	Distance between Plants.	No. of Plants.	Yield in Ears.	Yield in Grain.	Grain per Acre.
	Inches.		lbs.	lbs.	lbs. equal to muids.
1 ...	6	One	75	50	4.840 .. 24'40*
2 Detasseled ...	6	"	41	28	2.755 .. 13'155
3 ...	8	"	18	12	1.162 .. 5'162
4 Detasseled ...	8	"	31	21	2.033 .. 10'33
5 ...	10	"	29	19	1.833 .. 9'33
6 Detasseled ...	10	"	24	16	1.549 .. 7'149
7 ...	12	"	25	17	1.646 .. 8'46
8 Detasseled ...	12	"	27	18	1.743 .. 8'143
9 ...	12	Three	30	20	1.936 .. 9'136
10 Detasseled ...	12	"	32	22	2.130 .. 10'130
11 ...	18	"	21	14	1.367 .. 6'167
12 Detasseled ...	18	"	27	18	1.743 .. 8'143
13 ...	24	"	16	11	1.065 .. 5'65
14 Detasseled ...	24	"	24	16	1.549 .. 7'149
15 ...	30	"	26	17	1.646 .. 8'46
16 Detasseled ...	30	"	18	12	1.162 .. 5'162
17 ...	36	"	25	17	1.646 .. 8'46
18 Detasseled ...	36	"	32	22	2.130 .. 10'130
19 ...	24	Four	21	14	1.367 .. 6'16
20 Detasseled ...	24	"	32	22	2.130 .. 10'13
21 ...	36	"	31	21	2.033 .. 10'33
22 Detasseled ...	36	"	50	33	3.194 .. 15'194
23 ...	48	"	50	33	3.194 .. 15'194
24 Detasseled ...	48	"	64	43	4.163 .. 20'163

* Marginal row abutting on a six-foot pathway.

On the 28th we experienced the coldest weather since the opening of this Farm, the temperature dropping to 42 degs. The rainfall for the month has been light, only 1.56 inches falling.

W. JOHANSEN.

Manager.

WEENEN.

TO DIRECTOR EXPERIMENT STATIONS.—

During the month of May the work of organising the various sections has proceeded with very little interruption. As stated in my last report, the tobacco crop being harvested and cured now leaves me a little more freedom for outside work, although the above-mentioned crop has still to be handled again in the bulking and grading process. This can be left until such time as the winter crops are planted.

Approximately 6½ acres of the low land on the block have been laid out to test different varieties of wheats. It was found necessary to re-plough this land. As you are aware, this piece is very difficult to work in dry weather, but after severe treatment with the cement roller, clod crusher, and heavy harrows, a very fair seed bed was obtained; and the twelve varieties of wheat which I received from the Central Experiment Farm have been planted. The first varieties sown are now well above ground. This I consider a very valuable experiment, as these plots are of sufficient dimensions to show if this cereal can be profitably grown here on the Weenen Blocks. But I would not advise any block-holder to put all his eggs in the one basket, although there is no reason why everyone should not do a little towards supplying the great quantity of this food stuff required in the Colony.

Some two acres of land have been ploughed, and will be planted with six varieties of peas which are now on order. Considering the price asked for by the local seedsmen for imported seed, I should think this crop would be a very remunerative one, providing good varieties are grown. Land has also been prepared, approximately 2 acres, which it is intended to plant with lucerne. Some 2,000 celery plants have been planted out in trenches, and the following seeds have been sown in nursery beds: onions, rhubarb, asparagus, celery, and several other small lots of vegetable seeds.

Most of the black labour is at present engaged digging the main drain across the lower end of the Block, also various irrigation furrows.

The student who arrived from the Agricultural College, Central Experiment Farm, on the 22nd of the month has been of great assistance to me in carrying out the necessary work on the Station, as I cannot always (single-handed) attend to all the smaller details, which require attention if one is to carry out experiment work successfully.

Frost has been registered during the last five days of the month,

and I am told by the residents that the weather is exceptionally cold for this district.

Rain fell on three days, and totalled for the month 0.51.

The boys from the Government School paid their usual visits to the Farm during the month.

As has been reported to you, one ox died on the 31st May. All other live stock are healthy.

W. HOSKING,
Curator.

Laboratory Notes.

By ALEX. PARDY, F.C.S., Analyst.

ALUM.

A SAMPLE of naturally occurring rock alum was received for estimation of its value. The rock contained 51 per cent. of matter insoluble in water, and, as is characteristic with alums of this nature, the solution gave an acid reaction. The alum, which was found to be an ammonium alum, contained 45 per cent. of aluminium and ammonium sulphates and their water of crystallization, together with over one per cent. of potassium sulphate.

From a manurial point of view the rock offers slightly under 2 per cent. of Nitrogen and 0.35 per cent. of Potash, and, if compared with the valuations instituted in regard to commercial fertilizers, it should be worth about 30s. per ton as a fertilizer, its value being mainly due to its Nitrogen.

Alums, however, are considered more valuable in their relations to the arts and manufactures; and in this respect the alum in question may be more useful than as a manure. It is of rather low value to be placed on the market as a saleable manure.

PHOSPHATIC ROCKS.

Several samples of Natal rocks have been examined in the Laboratory, but none have yet satisfied the standard required by manufacturers; still there may be within our reach some such valuable rocks as yet undiscovered.

Some recently unearthed samples gave in part very hopeful prospects, but these were not sufficiently maintained when further mining

disclosed a larger area of the material and further reliable estimates were obtainable.

A rock recently to hand from another source proved on examination not to be a phosphatic rock, but consisted mostly of silica, iron and alumina with only a trace of Phosphoric Acid.

A good phosphatic deposit would mean a very great asset to the Colony, as we are at present more or less dependent on outside sources and have to import in large quantities. Were a rich material found there would be very little likelihood of its being neglected by manure manufacturers, who would be prepared to deal with it on a commercial scale.

Gardening Notes for July.

By W. J. BELL, Nurseryman, Florist and Seedsman, Maritzburg.

KITCHEN GARDEN.

Sowings may be made of Beet, Radish, Lettuce, Carrot, Turnip, Onion, also Herbs if not already sown, such as Parsley, Thyme, Sage, Marjoram, etc

If early plants are required of Cucumber and Marrow, Tomato and Capsicum, sow these towards the end of the month on a hot bed of fresh horse manure. A box or case with the bottom knocked out will serve for a frame, which may be covered up every night with matting or canvas to protect from frost and for conservation of the warmth. The seeds may be sown in paraffin tins and placed in the frame on a top layer of coal ashes. By the aid of this simple arrangement plants may be had ready for planting out early, immediately danger from frost is over.

The main sowing of Peas should now be made. The ground should be well trenched with a good layer of old well-decayed manure at the bottom of the first spit for the roots to feed on when the pods are swelling. In soils deficient in lime, some should be added when preparing the ground. Wood ash and burnt refuse will be very beneficial, especially if lime is not obtainable. If manure cannot be obtained and artificial fertilizers have to be used, guano, fish, and dissolved bone are suitable, if mixed with the soil at the bottom of the drill and covered with about four inches of soil.

After sowing, mulch the drills with a layer of old friable manure

and keep well watered. If grub is troublesome, dust with lime occasionally. Two sowings may be made for succession, one at the beginning and one at the end of the month. Any vacant ground that has not already been dug up should be prepared as soon as possible for spring sowing and planting by digging and trenching.

FLOWER GARDEN.

Hardy flower seeds may still be sown where frost is not too severe, such as Mignonette, Phlox, Pansy, Larkspur, Gaillardia, Candytuft, Salpiglossis, Poppy, Petunia, Dianthus, Antirrhinum, Calendula, ~~Cor-~~opsis, Cornflower.

Sow in boxes or tins, Daisy, Hollyhock, Pyrethrum aureum, Carnation, Shasta Daisy, Pentstemon and Verbena.

Towards the end of the month sow in seed pans or boxes, under glass, Coleus, Musk, Tuberous Begonia, Gloxina, double Petunia, Heliotrope, and Zanzibar Balsam.

Earthenware pans are the best for this purpose. First arrange a few crocks over the drainage hole, then a layer of cinders or broken brick, and on that a little moss or fibrous material. Fill up to within an inch of the rim with nice sandy soil, and finish off with a little finely sifted compost to form a fine surface in which the seeds may be sown.

Sift over the seeds only just sufficient fine soil to cover them and place a square glass on the pan and on that a sheet of brown paper to shut out the light till the seedlings commence to break through, then light may be admitted gradually.

It is a good plan to give the pans a good watering *before* sowing the seeds. Further watering will then not be necessary for some days, but care must be taken not to allow the surface to become dry while germination is taking place, or the finer seeds, such as Begonia and Petunia, will certainly perish. When water is required, it must be applied only in the form of a very fine spray. The better plan is to immerse the pan in water nearly up to the rim until the surface appears moist, but not a moment longer.

Roses may be pruned this month.

For the hybrid perpetuals cut out all weakly shoots. The weaker-growing varieties should be pruned back to three or four eyes, and the stronger varieties may be left twice that length.

Tea Roses require but little pruning, and it is only necessary to cut out dead and weakly wood.

All kinds of deciduous fruit trees should now be planted and pruned, such as Apples, Pears, Peaches, Plums, Nectarines, Almonds, Spanish Chestnuts, Filberts, Walnuts, also Raspberries, Blackberries, and Grape Vines.

With regard to the order of planting, stone fruits should be

planted first, particularly the early fruiting Peaches and Plums, and the beginning of the month is not too early for these.

The various kinds of deciduous flowering shrubs should also be planted this month, such as *Pride of India*, *Magnolia purpurea*, *Hibiscus mutabilis*, *Philadelphus*, *Deutzia*, *Althea*, *Virburnum opulus*, *Aloysia* (Lemon-scented Verbena), *Spiraea* (double White May), Pomegranate (double flowering), the double flowering Peach, Hawthorn, Lilac, etc., also deciduous creepers, such as *Ampelopsis* (Virginia creeper), *Wistaria* white and blue, the large flowering Clematis, *Begonia radicans*, *Mandevillea*, and *Clitoria*.

The herbaceous border should also have attention this month by digging and manuring, and old stools of plants should be taken up, divided and replanted.

Carefully fork round and manure clumps of *Liliums*, *Amaryllis* and other bulbous roots, and afterwards give a mulch of old well-rotted manure.

Correspondence.

NATIVE FARM LABOUR.

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

SIR,—I have very often noticed in Natal papers remarks by farmers and others as to how natives are managed in the Orange River Colony, and I have never yet seen a correct statement.

In your May *Journal*, Mr. Woods, in seconding a motion about kafir farming, states that in the O.R.C. "the difficulty had been overcome by a Squatters' Ordinance, which limited the number of natives living on farms to the number required for labour." This statement is incorrect. The law here allows the owner of a farm to keep ten families; a man who rents land, only five head; and a farm unoccupied by any white person, two families only. These natives are absolutely insufficient in number to work a farm. Every married man counts as a family, and out of ten married men on a farm at least five will have either no children or children too young to work. The average number of natives available to work is about 15, who work six months in the year, leaving, say, eight to work. This number is still further reduced by the absurd abolition of pass laws whereby all females and boys under the age of 16 require no passes whatever, and in cases of desertion it is useless to prosecute unless there is a proper contract.

Let me point out that the only way to control natives on farms is to have a law which says that the fact of a native living and plowing and grazing his stock thereon is sufficient contract.

The Native Department here is comprised of officials a great number of whom could not speak any native language. There is no Identification Pass Law, and, in consequence, the towns are full of runaways from farms and skibengas. Yours, etc.,

REGINALD A. LUCK.

Rensberg Kop, Swinburne, O.R.C.,
19th June, 1907.

CITRUS CULTIVATION. *

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

SIR,—There is a series of articles now appearing in the *Cape Agricultural Journal* that are fairly astounding and should be read by every one interested in this most important subject. They are astounding in their clever originality, and in their utter opposition to every other writer.

Mr. Masters, the writer, and the originator of the system, in my opinion clearly establishes his case, and proves by practical demonstration that the stock does influence the scion grafted on it, and further that, by second and third union grafting, it is possible to improve or otherwise according to the degree of assimilation.

I think that there can be no doubt that this work is the most valuable ever written of the subject and brings to light many things never rightly understood before; and it is peculiarly fortunate just at this time, when more attention is being paid to the exportation of our citrus fruits, that such an able treatise should be presented to the world. The writer has given years of toil and study to the subject, and has now in the clearest possible way given us the benefit of his experience. If the matter is properly taken up by the respective Agricultural Departments of our Colonies, I see a great future for South Africa. There is no doubt that we have a large area admirably adapted to the growing of citrus fruits in South Africa, and we should endeavour to produce the best possible, and thus ensure a ready market. I feel confident that if the Masters system is carried out this can be done. Anyone who knows anything of the subject must agree with me when I say that the bulk of the fruit now produced is not of the best. The matter is of such importance that not a moment should be lost by our Government in starting a citrus nursery on the Masters system in the very best possible locality; and it would be half-way towards success if Mr. Masters could be induced to manage the concern. Let it be clearly understood that the first in the field is likely to reap a huge harvest. After 20 years' study of citrus growing, I feel so convinced that Mr. Masters is right

that if I had £10,000 I would invest it to-morrow in proving to all that with this knowledge a tree can be produced best adapted to any soil and bear the best possible fruit of its kind and at the same time be as susceptible to disease as can be got—and, further, I would make a fortune.

This is peculiarly a matter for the State to take up, as it is far beyond the power of any ordinary nurseryman to do, as it requires a large capital, much leisure, and trained skill, and few individuals have all three requirements. It will be interesting to note how the various fruit-growing experts scattered about South Africa will take the new doctrine. I venture to think that most will be converted when they see the results. If our Government takes the matter up vigorously, there is no reason why our export trade in fruit in a few years' time is not a hundred times greater than it could ever hope to be on present lines.

Combined with this new era we should undertake a crusade against the fruit fly and provide it with plenty of poisoned fruit, but it must be a co-operative campaign and compulsory. It is done in Italy and can be done here, if we all earnestly desire to succeed.

I hope every citrus grower will read this very useful work, and the Coast Fruit Growers' Association should urge the Agricultural Department to get a vote of money placed on the Estimates for next year to start a nursery on these lines, and advise the best location.—Yours, etc.,

G. C. WILLIAMS.

Hilleot, Maritzburg.

HOUSE ANTS.

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

SIR,—In the April issue of the *Journal*, Mr. Wm. Grey writes about the annoyance of house ants over-running the table. It might be of interest to him, as well as others who are troubled with ants, to know of the system I here employed with absolute success for several years. Formerly the ants were so troublesome here that nothing was free.

Stand the table legs in tins or jars, or even small wooden boxes will do, sprinkle a coating of Keating's insect powder round the table legs, inside the tins, and the table will be free of ants. Although I have discontinued applying the insect powder for about two years the ants make no attempt to cross the border. Where it is impossible to make use of insect powder I have used traps; a tin plate with some waste fat will do. After regularly trapping the ants and destroying them for a few weeks, by putting the plate over the fire two or three times a day, the ants will leave the trap and its surroundings severely alone. There are millions of ants round and about the house, but they never give any trouble now.—Yours, etc.,

"MOOI RIVER."

Animal Diseases in May.

THE POSITION OF EAST COAST FEVER.

IN his report to the Minister of Agriculture, the Principal Veterinary Surgeon (Mr. S. B. Woollatt) states that the following outbreaks of East Coast Fever occurred during May:—Klip River, 4; Dundee and Umsinga, 3; Nqutu, 2; Vryheid and Ngotshe, 3; Paulpietersburg, 8; Hlabisa, 1; and Mahlabatini, 2. The deaths reported were:—Klip River, 103; Lower Tugela and Mapumulo, 692; Dundee and Umsinga, 109; Nqutu, 334; Vryheid and Ngotshe, 800; Durban County, 170; Muden, 31; Eshowe, 1; Paulpietersburg, 100; Ndwandwe, 540; Hlabisa, 210; and Mahlabatini, 100. The total number of deaths reported during the month was thus 3,190.

These figures give a fair idea of the progress of the disease during the month. The outbreak in the Ladysmith District, in the vicinity of Wessel's Nek, is an extension of the disease from the Dundee District; and it is hoped that, by careful investigation, it will be possible to definitely trace the source of infection. From the number of cattle which were found to be sick when the outbreak was detected, there can be no doubt, Mr. Woollatt thinks, that infection had existed in this locality for some time and that cattle had died at some previous date and their deaths had not been reported. In his experience, this is what invariably takes place when infection is carried to a fresh locality.

Owners are very loth, Mr. Woollatt continues, to report deaths; and the Veterinary Officers cannot know of all deaths which are occurring in a district unless owners will recognise their responsibility and report such deaths. Every effort has been made to impress upon owners the importance of reporting deaths; and the Magistrates have warned natives in infected and adjacent districts that all deaths must be reported. Notwithstanding this, the disinclination to report exists, and while this is the case outbreaks of the disease will smoulder in fresh localities until the death rate becomes so considerable that it will not be possible to any longer conceal the disease. It is, of course, recognised that the supervision, particularly in "native" areas, is in proportion to the money expended; but while one or two officers are expected to know of all deaths which may occur in a particular district covering an area of, say, 50 or 60 square miles, outbreaks of East Coast Fever can easily smoulder on without being detected, no matter how competent and vigilant such officers may be.

In the Ladysmith District all the cattle involved in the actual in-

infected area have been branded and the area guarded, and a zone is being formed around the area by the removal of the cattle from its outskirts towards its centre. This zone is imperative, Mr. Woollatt says, if any practical steps are to be taken to prevent the extension of the disease, as, although it might be argued that, being branded, the cattle could not leave the area without detection, yet, with the overlapping of grazing which always takes place in unfenced areas, the disease would gradually extend outwards from the present infected area and there would be no barrier to prevent such spread.

In the Dundee district the Veterinary Department is retaining control of a large number of cattle which are being passed through temperature camps, in case the system of stamping out is brought into force. Mr. Woollatt thinks there is no doubt that, unless the majority of these cattle are removed for slaughter, they will sooner or later become infected and be annihilated, as he is informed that further areas for the formation of temperature camps are not available. The outbreak which has occurred on the Sunday's River, in the Umsinga District, is reported not to be a serious one, although it is being treated as such. It exists in an isolated, inaccessible part of the country; and there would appear to be little doubt that the infection has been brought from the Dundee District. It is reported that deaths have been occurring for some weeks past. The matter is being fully investigated.

In the Muden area there were 31 deaths. The infection in this area is not as great as shown by the death-rate, but it will gradually increase as the deaths continue to occur.

In Durban County there were no fresh outbreaks reported during the month. The death-rate, considering the area infected, has been high, and the natives in the Umlazi Location will now shortly be able to satisfy themselves as to the mortality attending this disease. In this district also a zone is being formed to endeavour to check the extension of the infected veld.

In Victoria County all the Lower Tugela District is said to be infected, as well as the whole of that portion of the Mapumulo District extending right up to the Tugela and up to the Krantzkop and Umvoti borders. In that portion of the Mapumulo District towards Ndwedwe most of the cattle were removed during the recent Rebellion.

The disease has continued to make headway in the Paulpietersburg District, and the temperature camp system has been abandoned except in cases where the owner wishes his cattle treated. Many of the cattle which were removed from that portion of the district east of the township within the fenced area have been allowed to return, as this district has been free of cattle for over fifteen months. As it was not practicable to return them through the temperature camps, it is quite probable, however, that, even with the greatest care being taken, some infected animals may find their way back.

A large number of cattle in the Vryheid District have been, and continue to be, moved for slaughter purposes. Owing to the comparatively small number of cattle in the district, the disease, although gradually extending, is not spreading as rapidly or causing as much mortality as in other districts where cattle are more numerous. The district of Babanango is still, as far as is known, free from infection.

As regards Zululand, in the Nongoma and Mahlabatini Districts the disease is now so general that any attempt to lessen mortality is practically futile. The Veterinary Department has, in consequence, ceased to require cattle to be removed from veld on which they are running. All native guards have been discharged with the exception of those on the borders of diseased districts. The disease during the month has been found to definitely exist at Somkele, and there is no doubt that the whole transport road between that place and Nongoma is now infected. In Nqutu District matters are in very much the same position, and the disease appears to be gradually extending throughout the district.

During the month large numbers of cattle were forwarded from the infected areas for slaughter. This has been an advantage by reducing the number of cattle; but, strictly speaking, Mr. Woollatt thinks that nothing of real benefit, short of the removal of all cattle from infected and adjacent veld, can be carried out, and, even with such a policy, though marked results would be obtained early, yet the ultimate result could not be looked for for some considerable time. For the policy of stamping out to be pursued with the hope of ultimate success a definite scheme would, the P.V. Surgeon is of opinion, have to be taken up and carried out in its entirety to a finish.

OTHER DISEASES.

Lungsickness.—There were no fresh outbreaks reported during the month; and with the maintenance of quarantine on the infected herds, it is hoped that no fresh cases will occur.

Horsesickness.—This disease continued to cause mortality during the month, and the deaths reported are as follows:—Ladysmith, 1; Umvoti, 11; New Hanover, 6; Krantzkop, 2; Lower Tugela and Mapumulo, 1; Dundee, 7; Inanda and Ndwedwe, 1; Newcastle and Utrecht, 6; Vryheid and Ngotshe, 3; Durban County, 2; Weenen County, 10; Ixopo, 20; Lion's River, 24; Eshowe, 2; Alexandra, 2; Upper Umkomanzi, 3; Polela, 2; Ndwandwe, 3; Underberg, 35; Mahlabatini, 1—making a total of 142 deaths for the month. In the Mooi River District D.V.S. Verney reports that the disease abated somewhat during the month, which he thinks is probably due to the very slight frost that took place—the thermometer on many farms just reaching 32 degs.—but there was ample proof, Mr. Verney adds, to show that it requires a frost of several degrees to wipe out the infection of horsesickness.

Sheep Scab.—During the month there were 22 fresh outbreaks, and five licenses were raised. A considerable movement has been taking place in Northern Natal from the Orange River Colony and Transvaal for winter grazing. The Transvaal has agreed to an arrangement whereby sheep may cross the Border for this purpose on certificate, but in the case of the Orange River Colony that Colony does not see its way to coming to a similar arrangement.

Glanders.—There were three outbreaks of this disease during May: Nqutu, 1; Utrecht, 1; Durban, 1. Seven animals have been destroyed.

"Stiffsickness."—This disease has abated very considerably. It appears now to have run its course in the Colony and have become exhausted.

Biliary Fever.—Two cases of this disease occurred in the Durban District; they were put under treatment and recovered.

Importation of Stock by Sea.—D.V.S. Amos reports that 103 horses, 6 cows, 1 bull, 7 sheep, 11 goats, and 12 dogs were imported into Natal by sea during May. Of the horses 100 came from Australia and the other three from England. The sheep came from England, the cows from Cape Colony, and the bull from England. Six of the goats came from England and five from Germany.

Erratum.—In last month's issue of the *Journal* through a printer's error is was stated that eight deaths from East Coast Fever had occurred during April in the *Umzinto* Division instead of in the *Umvoti* Division.

LOWER UMFOLOZI GAME RESERVE.—It is notified in the *Government Gazette* that the Game Reserve No. 4 in the Lower Umfolozi Division, Zululand, which was established in 1897, has been extended to include the whole of the area contained within the following boundaries:—From the junction of the White and Black Umfolozi Rivers, down the Umfolozi to where the Imvamanzi Stream joins it, thence along the Imvamanzi Stream to its source, thence in a straight line to the highest point of the Sangoyana Hill, thence in a straight line to where the Mandhlakazi footpath crosses the White Umfolozi River, thence along the Mandhlakazi footpath to where it crosses the Black Umfolozi River, and thence along the Black Umfolozi River to its junction with the White Umfolozi River.

South African Markets.

THE prices for live stock, and animal and vegetable produce, on the Maritzburg, Durban, and Johannesburg markets during the month ended 15th June have averaged as follows:—

NATAL.

PIETERMARITZBURG.—The Market Master has furnished the following prices realised on the Maritzburg Market during the month:—

Live Stock.—Fowls, 1s. 9d; ducks, 1s 9d; turkeys (cocks), 9s; (hens), 4s 6d; guinea-fowls, 2s 9d; rabbits, 1s.

Animal Produce.—Bacon, 7d per lb; ham, 9d per lb; eggs, 1s 10d per doz; lard 8d per lb; butter, 1s 9d per lb; cheese, 9d per lb; meat, other than pork, 4d per lb; pork, 5d per lb; hides, 7d per lb; honey, 6d per lb.

Vegetable Produce.—Buckwheat, 12s per muid; earth nuts, 8s per muid; barley, £2 10s per ton; oats, £2 per ton; hay, 30s per ton; amabela, 9s per muid; geba, 7s per muid; mealies, 7s 6d per muid; potatoes, 7s 6d per muid; sweet potatoes, 4s per muid; peas, 18s per muid; onions, 12s per muid; beans, 12s per muid; pumpkins, 25s per ton; bananas, 1s per hundred; oranges, 1s 6d per hundred; naartjes, 2s per hundred.

DURBAN.—The Market Master reports the following prices realised on the Durban market during the month ended 15th June:—

Live Stock.—Fowls, 1s 8d; ducks, 2s 6d; turkeys, 7s 6d; guinea-fowls, 3s; rabbits, 9d.

Animal Produce.—Bacon, 7d per lb; meat, other than pork, 5d per lb; pork, 5d per lb; eggs, 1s 8d per dozen; butter, 1s 4d per lb; honey, 1s per lb.

Vegetable Produce.—Amadumbe, 5s per muid; beans, 15s 6d per muid; earth nuts, 7s 6d per muid; kafir corn, 8s 6d per muid; mealies, 8s per muid; potatoes, 8s per muid; sweet potatoes, 3s per muid; turnips, £3 per ton; apples, 9s per case of about 150; bananas, 6d per hundred; lemons, 1s per hundred; oranges, 9d per hundred; naartjes, 2s per hundred; mandarines, 1s per hundred.

E.C.F. and the Live Stock Market.—The principal factor affecting the live stock market in Natal has been, of course, the presence of East Coast Fever, the influence upon prices even extending, in some districts, to those of sheep and horses. For example, in the Polela district, there is practically no buying or selling of cattle taking place, and in order to keep going farmers have consequently sold sheep and horses, the flocks and troops of these animals being thereby reduced.

From practically every district from which reports have been received comes the same account of the prices of cattle; and in many

districts the market is either stagnant or non-existent. In the districts of Klip River and Umvoti West, however, from £8 to £10 and £8 to £12, respectively, have been obtainable for oxen; whilst in the Lower Umzimkulu Division good prices have been realisable for good milking stock, £20 being obtained for a 15-bottle cow. Oxen at a forced sale fetched from £4 to £7 15s each.

TRANSVAAL.

JOHANNESBURG.—Writing under date 17th June, Mr. Alfred Webb, produce agent to the Cape Government in Johannesburg, P.O. Box 2342, has furnished the following prices realised on the Johannesburg market during the week ended 14th June:—

MARKET PRICES.

Live Stock.—Cows (milk), £18 to £40; oxen (slaughter), £7 10s to £10 10s; oxen (dressed), £1 10s to £1 13s per hundred lbs; pigs, 3½d to 4d per lb (live weight); sheep (slaughter lambs), 21s to 22s 6d; sheep (dressed), 5½d to 5¾d per lb; donkeys, £6 to £8 10s; mules, £15 to £20; ducks, 2s 6d to 3s 3d; fowls, 1s 9d to 3s; turkeys (cocks), 6s to 11s 6d. (hens), 3s 6d to 6s 6d; geese, 5s 6d.

Animal Produce.—Eggs, new laid, 2s to 3s 6d; fresh, 1s 9d to 2s per dozen; butter, 1s to 1s 6d per lb.

Vegetable Produce.—Bran, 9s to 9s 6d per bag of 100 lbs. net; barley, 11s 3d to 12s per bag of 160 lbs net; green barley, 7s 6d to 1s 1d per hundred bundles; beans (dry), 17s 6d to 41s 6d per bag of 200 lbs net; forage, 6s 9d to 8s 6d per hundred lbs; kafir corn, 11s 9d to 13s 3d per bag of 200 lbs net; lucerne (dry), 5s to 7s per hundred lbs; mealies (yellow), 9s 3d to 10s 9d; (white), 9s 3d to 9s 9d; (mixed), 9s 3d to 10s per bag of 200 lbs net; onions, 8s to 12s 6d per bag of 120 lbs net; oats (seed), 10s 3d to 12s 6d per bag of 130 lbs net; peas (dry), 20s 6d to 24s per bag of 200 lbs net; potatoes, medium, 13s to 17s 3d; inferior, 8s to 12s 6d per bag of 160 lbs net; sweet potatoes, 6s to 8s 6d per bag of 120 lbs net; wheat, 17s 9d to 20s 9d per bag of 200 lbs net; bananas, 2s to 3s per hundred; lemons, 2s to 5s per hundred; naartjes, 3s to 6s per hundred; oranges, 2s to 5s per hundred; pineapples, 2s to 3s 6d per dozen; quinces, 4s 3d per hundred.

Remarks.—Mealies, bran, chaff, manna, forage, and rye maintain the same prices as the week before. Beans and peas are better. Good green lucerne is much better. Supplies are, however, limited. Potatoes and onions are firm at last week's prices. Fowls, ducks and geese are firmer. Eggs are a little easier. In the live stock line prices are unaltered. There is only a good demand for prime slaughter bullocks. In medium sorts the market is overstocked. Pigs and sheep are about the same as last week.

NOTES.

Mr. Webb also contributes the following notes on the Johannesburg produce and live stock market:—

Slaughter Stock.—The month ending 15th inst. has been a disappointing one to live stock owners. Speculators in Natal-killed meat have rushed the market with heavy supplies, and prices have consequently sagged all round. No doubt the anxiety to dispose of slaughter animals whilst in good condition has had something to do with the large quantities of stock sent up for sale during the month under review, but too often is it the case that owners forward without any previous enquiry as to local requirements, and disappointment, discontent and loss is caused thereby. Correspondence with a reliable agent should always precede the actual forwarding of most lines to this market. Johannesburg buyers have plenty of stock to choose from at the moment, and only animals in prime condition and ready for immediate slaughter are looked at.

Fowls.—Prices for all classes of poultry shew a hardening tendency, and this market should be worth watching during the winter.

Eggs.—An increasing demand exists for new laid and fresh at profitable prices. Contracts can be placed if required.

Butter.—Can place any quantity in small or large lots, either of first quality or inferior grades. Farmers should cultivate this market for yearly contracts. Full information supplied upon application.

Mealies.—Good, hard, dry yellow, are mostly in demand at the moment. Of the white varieties Hickory King sells best. Supplies of all kinds for the past month have been very heavy, and prices are consequently easier.

Kafir Corn.—Best quality red is easily sold at top price, supply being short of demand. Fair inquiry for white at lower rates.

Lucerne (Pressed).—Best quality, locally grown, green coloured, fetches 7s per 100 lbs. Colonial-grown second quality averages out at 6s. Bales should be well pressed, cut and wired, and contents should be dry, cool, sweet, of good green colour and free from weeds and dust.

Forage (Pressed).—Best quality Western Province maintains its high level, but the supply is limited. Best quality from other districts is promptly bought at good prices. The market can absorb more than is at present coming forward.

Barley.—A good demand exists at to-day's prices.

Wheat.—If of good quality, 21s per 200 lbs can be usually obtained.

Beans (Dry).—Prices for best whites and sugar beans are still firm in the neighbourhood of 40s per 200 lbs. Growers are advised to use discrimination in sorting and packing. New bags should always be used for articles like beans, peas, and potatoes, and full weight given. This means at least 1s 6d per bag better price.

Fruit.—Apples and pears fetch good prices. Fair supply of oranges, lemons, naartjes, etc. Growers should grade and pack carefully. Correspondence invited.

Coal and Labour Return.

Return of Coal raised and Labour employed at the Natal Collieries for the month of May, 1907 :—

Name of Colliery.	Average Labour Employed.									Output.	
	Above Ground.			Below Ground.			Unproductive Work.*			Tons.	Cwt.
	E.	N.	I.	E.	N.	I.	E.	N.	I.		
Elandslaagte ..	14	19	267	15	90	452	9	16	14	15,748	12
Natal Navigation ..	29	58	206	19	225	144	—	—	—	15,686	12
Glencoe, Natal ..	13	104	77	11	501	12	—	—	—	14,346	6
Durban Navigation ..	29	165	62	11	347	58	—	8	—	13,797	0
South African ..	10	10	90	11	210	50	5	25	45	10,226	6
Natal Cambrian ..	11	32	129	10	225	5	2	2	—	8,070	13
Dundee Coal Co. ..	15	13	190	8	40	292	2	—	26	7,292	15
St. George's ..	16	90	143	11	185	89	—	10	—	6,188	0
Newcastle ..	7	42	20	6	206	2	1	2	—	6,027	12
Ramsay ..	2	12	45	5	140	100	3	6	11	3,231	17
Natal Steam Coal Co. ..	1	44	3	2	138	2	—	1	4	3, 65	14
West Lennoxton ..	5	1	64	2	25	97	—	—	—	3,891	0
Central ..	2	48	9	4	180	6	2	10	—	2,882	11
Talana (Natal) ..	3	28	23	3	72	68	1	2	2	2,068	1
Zululand ..	4	41	—	1	40	—	1	—	—	288	10
Woodlands ..	2	7	4	1	8	5	—	—	—	195	0
Signal Hill ..	—	—	—	—	—	—	1	1	—	19	0
Dumbi Mountain† ..	1	2	—	—	—	—	—	—	—	7	10
Nootgedacht ..	—	2	—	1	3	—	—	—	—	6	0
Totals ..	161	713	1,332	121	2,828	1,433	27	83	192	122,429	19
Corresponding month, '06	140	681	1,082	126	2,385	1,42	51	272	177	106,047	10

* Cost charged to Capital Account.

† April Return.

Maritzburg,
6th June, 1907.

CHAS. J. GRAY,
Commissioner of Mines.

Return of Coal bunkered and exported from the Port of Durban for the month of May, 1907 :—

					Tons.	Cwt.
Bunker Coal*	...	...	...	...	45,239	7
Exported to :—						
East London	...	...	...	...	7,530	2
Algoa Bay	...	...	...	...	3,853	9
Cape Town	...	...	...	...	18,483	9
London	...	...	...	...		10
Mauritius	...	...	...	...	615	14
Beira	...	...	...	...	59	1
Total	...	..	..	...	75,781	12

* Including Foreign Warships.

Custom House, Port Natal,
1st June, 1907.

(Signed) GEO. MAYSTON,
Collector of Customs.

Return of Farms at Present under Licence for Lungsickness and Scab.

STOCK INSPECTOR.	DISTRICT.	DISEASE.	OWNER.	FARM.
A. P. Crow	Ladysmith	Scab	A. W. Illing	Minitams
		"	Mzambi	Rosboom
		"	J. N. De Waal	Blauw Bank
		"	Vel um	"
		"	Mholosi	"
		"	Iugenga	Roodepoort
		"	P. Nicholson	Nicholson's Nek
		"	H. Bowes	Zaarfontein
		"	Mabela	Roodepoort
		"	J. Pepworth	Kenvogel Vlei
		"	D. Sparks	Berg View
J. B. Cooper	Nkandhla & Ngutu	Lungsickness	W. Wright	Maggiesdale
S. A. Brown	Underberg	Scab	L. Makoba	Middle Drift
		"	M. Butelezi	Jojoasini
		"	J. A. Stone	"
		"	T. de C. Arbuckle	Kerridge
		"	B. Phipson	Strathcampbell
		"	M. Fraser	Winterhoek
		"	B. C. Gold	Woo end
		"	J. K. Royston	Greenend
		"	J. van Whye	Silburn
		"	F. A. Hathorn	Sau-uana
		"	T. Palfreman	Slogoma
A. B. Koe	Portion of Estcourt	"	H. J. Hattling	Servitude
		"	J. J. B. Cooke	Estcourt
		"	Sclander Bros.	Kelvia
		"	Mnati	Labuschagne's Kraal
		"	H. L. Frances	Rietfontein
		"	Bacon & Kelly	Winterton
A. J. Marshall	Dundee	"	F. R. Moor	Greystones
		"	R. J. du Bois	Gilba
		"	J. W. de Bruyn	Rooifontein
		"	C. M. Vermaak	Paddock
		"	L. W. Meyer	Langverwacht
		"	A. L. Jansen	Strathearn
		"	J. O. Nel	Earncliffe
		"	A. C. Vermaak	Sigtuna
		"	T. C. Vermaak	Harriotsdale
		"	H. Vermaak	Paddock
E. Varty	Western Umvoti	"	W. J. Slattey	H. Im Lacy
J. J. Hodson	Ptn of Lion's River	"	H. Hansmeyer	On Rust
		"	G. H. Burgmann	Bos l oek
		"	W. A. Dales	Gowrie
		"	N. McVellar	Glenafton
		"	B. Spiers	Moyeni
R. Mayne	Krantzkop	Lungsickness	W. Willson	Thornton House
		"	P. R. Nel	Broeder's Hoek
		"	Maqamganse	Loots Hoek
		"	Uqupu	Myoniezwe's Locat'n
		"	Ndabane	"
		"	S. Johnson & Co.	Inadie Store
		"	Ndabane	Myoniezwe's Locat'n
		"	Natives	Spitzkop
		"	"	Myoniezwe's Locat'n
		"	J. S. van Rooyen	Spring Grove
A. H. Ball	Weenen	Scab	H. L. van Rooyen	Krantzkop
		"	G. J. van der westhuizen	Winterhoek
		"	C. H. B. Atcher	Golden Valley
		"	J. P. Lotter	Bergvleit
		"	C. F. Lotter	Blinkwater
		"	E. E. Robinson	Mona
G. Daniell	Vryheid	"	D. Coetzee	Schaapkopje
		"	R. L. Davies	Kambuldraai
		"	Nkanyeze	Mooiplants
		"	Mhomom	Anhouvin
		"	Hlabalan	Nootgedacht
		"	J. C. Emmett	Goudhoek
		"	P. H. Tredoux	Bellvas
		"	Myamana	Walcevrede

RETURN OF FARMS AT PRESENT UNDER LICENCE FOR
LUNGSICKNESS AND SCAB—*continued.*

STOCK INSPECTOR.	DISTRICT.	DISEASE.	OWNER.	FARM.
L. Mayne ..	Eastern Umvoti ..	Lungsickness	C. van Rooyen ..	Boschtontein
		"	D. A. Nel ..	Olen Boig
		Scab	Nkabi and others	Loots Hoek
		"	P. R. Botha ..	Olivefontein
		"	Nkomo ..	Thorn View
J. Button ..	Portion of Estcourt	Lungsickness	Mshugongubu ..	Olivefontein
		Scab	J. Bird ..	Mooi River Tn Lds.
		"	J. Phipps ..	Littlecote
		"	Johnstone & Clark	Bergnian
		"	J. H. Smith ..	The Grove
		"	P. Ballantyne ..	Town Lands
		"	W. Smith ..	Riverside
E. Parkin-on ..	New Hanover ..	"	C. L. Jonsson ..	Darlington
A. Hair ..	City and Umgeni ..	"	Ndabeni and Jim ..	Location
D. M. Pfaff ..	Utrecht ..	"	Umbabana ..	Zwaartkop Location
			G. S. Dicks ..	Groot Vlei

MANGE IN HORSES EXISTS AS UNDER.

Name.	District.	Name.	District.
W. K. Oates ..	Bergville	Nseleni ..	Underberg.
Mboyea ..	Bergville.	A. G. Stafford ..	Harding

SUGAR CONVENTION.—According to a Reuter's telegram in the daily press early in June, Sir Edward Grey has announced in the House of Commons that the Imperial Government has intimated to the signatories of the Sugar Convention that it considers a limitation of the sources from which sugar can enter Great Britain inconsistent with the Imperial Government's declared policy, and incompatible with the interests of consumers and manufacturers. Consequently Great Britain is prepared to withdraw from the Convention at the earliest possible moment.

Meteorological Returns.

Meteorological Observations taken at Government Stations for Month of May, 1907.

STATIONS.	TEMPERATURE (IN FAHR. DEGS.).				RAINFALL (IN INCHES).					
	Means for Month.		Maximum for Month.	Minimum for Month.	Total for Month.	No. of Days.	Heaviest Rainfall in 1 day.		Total for Year from July 1st, 1906.	Total for same period from July 1st, 1905.
	Maximum	Minimum					Fall.	Day.		
Observatory ..	75.4	58.8	87.3	41.1	.73	12	.20	7th	41.03	36.88
Stanger ..	77.0	57.8	91	46	1.60	10	.57	17th	38.75	30.55
Verulam ..	78.5	57.5	88	40	1.32	7	.54	21st	42.09	28.75
Greytown ..	71.9	48.6	88	29	1.37	8	.43	2nd	37.27	25.02
Newcastle ..	72.4	46.0	79	28	.15	2	.15	21st	5.61	30.27
Ndwedwe ..	67.8	56.6	78	44	1.15	11	.38	21st	40.66	37.26
Estcourt ..	71.7	41.7	82	24	.30	2	.25	3rd	30.66	24.82
Camperdown ..	74.4	47.6	90	35	1.18	5	.51	22nd	30.54	—
Mid-Illovo ..	70.5	51.7	87	37	1.50	8	.40	7th	44.28	29.48
Port Shepstone..	76.8	53.0	91	43	2.35	7	.71	22nd	—	—
Umtinto ..	69.5	50.3	74	41	1.52	4	.88	7th	47.08	36.02
Richmond ..	70.5	46.9	85	34	1.00	8	.38	21st	51.88	34.62
Maritzburg ..	73.1	46.1	85	32	.92	9	.33	21st	53.05	25.93
Howick ..	69.6	41.8	87	22	1.15	8	.35	1st	43.73	24.32
Ludysmith ..	70.4	41.1	81	30	.34	3	.16	5th	—	—
Dundee ..	69.6	49.3	78	31	.55	2	.34	22nd	37.61	25.14
Weenen Gaol ..	78.7	43.3	87	24	.38	5	.26	2nd	30.85	22.45
Impendhle ..	63.1	46.5	77	20	.58	10	.17	14th	46.71	—
New Hanover ..	69.5	45.4	88	29	1.61	9	.47	21st	55.80	21.30
Charlestown ..	67.3	33.7	73	27	.46	4	.25	6th	53.46	—
Vryheid ..	73.3	47.1	80	31	.45	4	.20	24th	36.95	—
Nongoma ..	71.9	46.4	80	33	1.02	3	.60	2nd	48.07	21.97
N'Kandhl ..	70.2	39.8	76	31	.78	5	.25	7 & 22	34.65	24.90
Nqutu ..	70.2	46.0	79	32	1.09	5	.49	22nd	—	2.47
Hiabisa ..	76.0	57.6	84	45	.52	1	.52	25th	44.93	27.20
Melmoth ..	72.1	53.2	85	37	1.44	10	.61	27th	38.69	23.21
Ubombo ..	70.2	55.8	87	41	.54	4	.30	26th	49.41	—
Point ..	—	—	—	—	.74	5	.30	7 & 21	42.37	37.96
Anatinkulu ..	77.7	55.6	94	42	.67	10	.16	6th	27.66	—
Mahlabatini ..	74.9	49.4	84	36	1.22	7	.41	26th	38.90	28.78
Empangeni ..	—	—	—	—	1.03	3	.58	27th	34.27	—
Buwer ..	—	—	—	—	1.66	15	.55	2nd	—	—

Meteorological Observations taken at Private Stations for Month of May, 1907.

STATIONS.	TEMPERATURE (in FAHR. DEGREES)		RAINFALL (in inches).					
	Maximum for Month.	Minimum for Month.	Total for Month.	No. of days.	Heaviest Rainfall in one day.		Total for Year from July 1st, 1906.	Total for same period from July 1st, 1905.
					Fall.	Day.		
Giant's Castle ..	75	28	0.46	3	0.30	3rd	—	—
Bramholme (Charles Scott) ..	..	..	1.07	4	1.0	2nd	66.06	39.46
Dalton (Fawn Leas P.O.) ..	..	..	1.24	8	0.37	6th	38.24	..
Nottingham Road (C. J. King) ..	..	..	0.99	..	0.25	2nd	50.25	36.27
Riet Vlei ..	..	..	1.54	6	0.92	24th	33.68	..
Adamshurst (Wm. Adams) ..	81	34	0.77	6	0.25	27th	37.27	23.32
Hilton College (W. Engel) ..	84	29	1.30	8	0.40	3. d	48.71	38.32
P.M.B., Town Bush Valley ..	..	..	1.07	4	0.52	27th	53.68	36.17
Mid-Illovo ..	..	87	1.59	8	0.40	7th	41.28	29.48
Ottawa (G. Wilkinson) ..	..	..	1.07	6	0.43	22nd	43.36	..
Mount Edgcombe (Natal Estates) ..	95	44	1.13	9	0.52	22nd	48.36	38.66
Cornubia ..	..	..	1.08	..	..	..	50.78	32.71
Milkwood Kraal ..	..	..	0.64	..	..	..	37.76	24.89
Blackburn ..	..	..	0.83	..	..	..	42.24	29.15
Saccharine ..	..	..	0.87	..	..	..	43.38	29.84
Equeefa (W. Hawksworth) ..	91	43	0.93	7	0.50	7th	51.07	34.65
Umtinto, Beneva ..	..	..	1.17	8	0.61	6th	48.57	33.65
Cedara—Hill Station ..	75	26	0.93	4	0.45	21st	40.41	30.61
" Vlei ..	53	26	0.72	7	0.43	2 st	..	..
Winkel Spruit ..	84	42	1.56	8	0.52	26th	44.39	33.78

Pound Notices.

NOTIFICATION is contained in the *Government Gazette* of the sale, unless previously released, of the undermentioned stock on the dates specified:—

On the 10th July:—

Solferino (Gourton).—Black ram, slit on back of right ear, white eyes. Probable value, 10s. Impounded on the 31st May by a native on location.

On the 17th July:—

Bulwer.—Running on the farm "Burnside," Underberg, and reported by Mr. Geo. Malcolm, on 1st June, as being too wild to be driven to Bulwer Pound: Brown filly, about 2 years old, black points, height about 13·2 hands, no brands or marks.

Camperdown.—Mouse-coloured mule, gelding, black stripe down back, branded 418 over N.S. on near rump, large brand indistinct off hind quarter, 2 on off side of neck, inoculation mark on near side of neck, about 13·2 hands.

Finchley (Ixopo Division).—(1) Dun ox, a few white spots on body, half of right ear cut off, also tip of left ear. (2) Black gelding, blind in near side eye, marks of very bad old sore back, very old.

Hatting Spruit.—(1) Black yellow-spotted boar, no ear marks. (2) Berkshire hog, no ear marks. (3) White Yorkshire sow, near ear torn.

Impendhle.—(1) Brown ewe goat, slit in right ear. (2) White ewe goat, slit in right ear.

Loteni (Impendhle Division).—(1) Brown gelding, indistinct brand on off hind leg (? F.S.). (2) Bay gelding, no brands, white hairs on head. (3) Grey gelding, no brands. (4) Bay gelding, white near hind hoof, no brands, white off fore foot. (5) Black gelding, no brand, two white hind feet. (6) Bay gelding, no brands, white off hind heel. (7) Bay mare, no brands, star, two white hind feet. (8) Ewe lamb, brand C.I. on left side. (9) Ram lamb, indistinct brand on left side. (10) Bay gelding, indistinct brand on off hind leg, white near hind fetlock, switch tail.

Melmoth.—Black-and-white he-goat, impounded on 16th May.

Nkandhla.—Black gelding, 14·2, white fore fetlocks, white off hind fetlock, branded P near hind quarter.

Solferino (Gourton).—(1) Black ewe, with yellow legs and belly, three cuts in left ear, two cuts in right ear. (2) Yellow lamb, with black marks, two slits in left and one slit in right ear. (3) Black ewe, with no horns, slit in both ears, with black ewe lamb. (4) White ewe, long horns, 4 years old, two slits in right ear. (5) Black ewe goat, two years old, two slits in each ear. (6) Black and yellow goat, slit in right ear, tip cut off left ear. (7) White ewe, slit on back of left ear. (8) White ewe, slit on front of left ear. (9) White he-goat, two slits on back of right ear and swallow tail on left ear.

Utrecht.—Five mixed Kafir goats, no marks or brands. Probable value, about 25s.

Diamond Drilling.

SOME of the departmental diamond drilling plants are at present disengaged and available for hire for boring for either minerals or water. Particulars as to terms of hire may be obtained from the undersigned.

CHAS. J. GRAY,
Commissioner of Mines.

Agricultural Shows.

LADYSMITH, Friday, 5th July.—All entries close 30th June. President: Herman Illing. Secretary: E. Scott, Box 90, Ladysmith.

CAMPERDOWN, 5th July.—President: John Moon. Hon. Secretary: — Wilson.

UMZINTO, Thursday, 11th July.—All entries close 9th July. President: W. Thomson. Secretary: George Lamb, Umzinto.

DURBAN, 18th, 19th and 20th July.—President: W. R. Poynton. Secretary: J. D. Ballance.

RICHMOND, Thursday, 25th July.—All entries close 12th July. President: John Marwick. Hon. Secretary: T. McCrystal, Box 32 Richmond.

DATES NOT FIXED.

MID ILLOVO (Date not fixed).—President: B. B. Evans. Secretary: C. B. Lowe, Mid Illovo.

NEW HANOVER (No Show on account of F. C. F.).—President: R. H. Oellermann. Secretary: W. D. Stewart, New Hanover.

NOODSBERG ROAD (Date not fixed).—President: Fritz. Reiche, J.P. Secretary: Paul Vietzen, P.O. Singletree.

STANGER (Date not fixed).—President: F. Addison. Secretary: H. C. Smith.

OTHER SHOWS.

PIETERMARITZBURG HORTICULTURAL SOCIETY, 17th October.—President: T. R. Sim, F.L.S. Hon. Secretary: S. Colman, Deeds Office, Maritzburg.

Trees for Sale.

To encourage tree-planting, transplants and seeds of forest trees are supplied by Government, so far as in stock, at the undermentioned rates, exclusive of carriage, from the Government Nursery, Central Experimental Farm, Oedara.

Transplants of Eucalyptus, Pines, Acacias, Casuarinas, Cupressus, etc., about 25 trees in each tin, at 8s. 4d. per 100 trees. Trees in separate tins at 1s. each.

Transplants of scarce kinds, larger trees, or surplus stock, when available, will be charged at special rates, which will be furnished on application.

Tree seeds, in variety, at 1s. per packet. Price per pound, which fluctuates, will be furnished on application.

Package and postage of seed, when required, charged 1s. per lb. extra.

Orders for present or spring delivery should be addressed to the **Forester, Oedara**, and must be accompanied by a remittance in cash or postal order. Cheques cannot be accepted.

T. R. SIM,
Conservator of Forests.

East Coast Fever.

SLAUGHTER CATTLE.

THE Department of Agriculture has erected abattoirs adjoining the Government Cold Stores, Maritzburg, where people will be able to forward cattle from clean and infected areas for slaughter. Killing, chilling, and freezing can be undertaken by the Department if desired, and arrangements can also be made for the forwarding by rail of meat intended for sale in markets outside Maritzburg. This will enable farmers, who wish to dispose of their stock for slaughter and find a difficulty in so doing, to have their animals killed in Maritzburg and the meat forwarded to Durban or any other market. The abattoirs will be under the personal supervision of Mr. A. R. Burford, the Manager of the Government Cold Stores, who is thoroughly experienced in this particular class of work.

The provisional abattoir charges are :—

Cattle per head	...	...	1s., with a minimum of £3 per killing space per month.
Sheep	...	...	1½d. each.
Pigs...	...	...	3d. "
Chilling and Freezing Beef, 1st week	...	...	1s. 3d. per qr.
"	"	2nd "	1s. "
"	"	Remaining weeks	9d. "
Sheep "	...	per week	3d.
Pigs	...	"	6d.

Charges for killing and handling Cattle, and placing same in Cold Storage, if required, or meat to be taken away by customer from hanging-room :—

Cattle, per head	...	...	4s. each (including abattoir fee).
Sheep	...	...	6d. "
Pigs	...	...	1s. " up to 200 lbs.
"	...	...	1s. 6d. each, over 200 lbs. & up to 300 lbs.
"	...	...	2s. " over 300 lbs.

Department of Agriculture, Maritzburg,
9th April 1907.

W. A. DEANE,
Minister of Agriculture.

Model Rules for Agricultural Co-Operative Societies.

THE Department of Agriculture has for disposal, at the rate of one shilling each, copies of Model Rules for the use of Agricultural Co-operative Societies. Applications should be made to the Secretary, Minister of Agriculture, Pietermaritzburg.

Executives of Farmers' Associations.

ALFRED COUNTY FARMERS' ASSOCIATION.—President: A. G. Prentice, J.P. Vice-Presidents: C. Knox, J.P., L. T. Trenor. Committee: C. M. Etheridge, E. J. Gray, W. B. Rethman, H. W. F. Rethman, O. A. Howell, R. E. H. Fann, J.P., W. T. J. Gold, Dr. Case, Revd. S. Aitchison. Hon. Treasurer: H. C. Hitchins. Secretary: T. Tribe.

BOSTON FARMERS' ASSOCIATION.—President: Thomas Fleming. Vice-President: J. Geldert. Hon. Secretary and Treasurer, W. J. Fly.

CAMPERDOWN AGRICULTURAL SOCIETY.—President: John Moon, C.O.; Vice-Presidents: A. N. Kirkman, J.P., and G. Swales; Hon. Secretary: — Wilson.

CAMPERDOWN AND DISTRICT FARMERS' ASSOCIATION.—President: John Moon. Vice-President: F. N. Meyer. Hon. Sec.: L. Baker.

DUNDEE AGRICULTURAL SOCIETY.—President: F. Turton, Esq., J.P. Vice-Presidents: The Minister of Agriculture, the Mayor of Dundee, Messrs. A. L. Janzen, H. Ryley, and W. Craighead Smith, J.P. Hon. Secretary and Treasurer: J. McKenzie. Committee: D. C. Pieters, D. Macphail, W. H. Tatham, H. Baasch, M. Taylor, J. A. Landman, N. F. Hesom, A. W. Smallic, C. W. W. ysall, W. Craig, C. G. Willson, T. P. Smith, J. Campbell, J. B. Duboissee, W. R. Quedsted, A. Grice, D. Meumann, W. J. H. Muller, J. E. Caldwell, E. C. Saville, C. M. Meyer, A. J. Oldacre.

DURBAN COUNTY FARMERS' ASSOCIATION.—Patron: J. H. Colenbrander. President: J. McIntosh. Vice-Presidents: H. Westermeyer, R. R. McDonald. Committee: F. R. W. Boehmer, G. Compton, H. Freese, W. Freese, W. Gillitt, H. W. Koenigkramer, H. W. Nichols, F. Schaefermann. Hon. Sec. and Treasurer: Frank J. Voiek.

GOURTON FARMERS' ASSOCIATION.—President: W. C. Stockil, Esq., J.P. Vice-President: M. Sandison, Esq. Hon. Secretary and Treasurer: Frederick B. Burnard, Esq.

HATTING SPRUIT FARMERS' ASSOCIATION.—President: Wm. Craig. Vice-President, J. Campbell; Committee: J. J. S. Maritz, G. De Waal, H. J. Hearn, Thos. Brookes, N. Glutz, H. Glutz, W. A. Quedsted, J. A. Brookes, W. J. Hislop, Thos. Dewar, J. Humphries, W. H. Patham, A. E. Norman, D. W. H. Tandy; Hon. Secretary and Treasurer: R. J. Hearn.

HIMEVILLE AGRICULTURAL SOCIETY.—President: Henry C. Gold, Dartford, Polela. Vice-Presidents: W. Little, R. Justice, G. Malcolm. Executive Committee: G. Malcolm, W. S. Johnston, P. McKenzie, W. Little, G. Royston. Hon. Secretary and Treasurer: Thos. E. Marriott, Brookdale, Polela. Assistant Secretary: F. W. Fell, Ericksburg, Polela.

HOWICK FARMERS' ASSOCIATION.—Chairman, Thos. Morton; Vice-Chairman, M. A. Sutton; Hon. Secretary and Treasurer, A. Clark.

INGOGO FARMERS' ASSOCIATION.—President: Angus Wood, J.P. Vice-Presidents: G. A. Fimstone and J. Browning. Hon. Secretary and Treasurer: C. Watt.

IXOPO AGRICULTURAL SOCIETY.—President: W. Arnott. Vice-Presidents: F. L. Thring, J.P., John Anderson, C. E. Hancock, J.P. Committee: W. K. Anderson, J.P., Thos. Allen, J. C. Auld, H. D. Archibald, F. S. Benningfield, S. Boyd, F. E. Foxon, R.M., Wm. Foster, Jas. T. Foster, Geo. E. Francis, L. Gray, A. M. Greer, J.P., J. R. Greer, Wm. Gold, Jno. Gold, H. A. Hill, C. F. Harriss, A. E. Keith, R. Kennedy, Geo. Martin, W. Oakes, L. J. Phipps, T. F. Remfry, J. W. Robinson, Jas. Schofield, M.L.A., A. Stone, W. B. Way, G. C. Way, A. H. Walker, M.L.A., J. L. Webb (F.R.C.V.S.). Hon. Sec: R. Vause. Hon. Ass. Sec.: C. K. D. Beales. Hon. Treasurer: T. Arnott.

IXOPO FARMERS' ASSOCIATION.—President: A. E. L. Keith, Ixopo. Vice-Presidents: Geo. Martin, Claybrooke, Ixopo; A. Kirkman, Lufafa, Ixopo. Hon. Secre.ary and Treasurer: Geo. E. Francis, Morningview Ixopo. Delegates to Farmers' Union: President and James Foster. Committee: F. Remfry, R. Vause, C. E. Hancock, John Anderson, E. Greer, W. Oakes, D. Campbell, G. C. Way, James Foster.

KLIP RIVER AGRICULTURAL SOCIETY.—President: Herman Illing; Vice-Presidents: J. T. Francis, J. G. Bester, W. Pepworth, Auditor: J. T. Francis.

Esq. Secretary: E. Scott, F.I.A. (Lond.). Executive Committee: A. Brink, D. Bester, J. Farquhar, O.M.G., W. C. Hattingh, J. G. Hyde, Trev. Hyde, A. L. Horsley, W. Freer, L. A. Leonard, H. Nicholson, J. H. Newton, J. T. Sandalls, W. H. Roberts, H. C. Thornhill.

LIONS RIVER DIVISION AGRICULTURAL SOCIETY.—President: Graham Hutchinson; Vice-President: H. Nisbet; Executive Committee: H. Nisbet, M. A. Sutton, A. J. Holmes, J. Humphries, Jno. Pole, and W. A. Lawton; Auditor: W. J. R. Harvard; Hon. Sec. and Treasurer: Arthur F. Dicks, P.O. Box 1, Howick.

LOWER TUGELA DIVISION ASSOCIATION.—President: T. G. Colne, brander. Vice-President: Lieut.-Col. F. Addison. Hon. Secretary and Treasurer: H. Curtis Smith. Committee: A. S. L. Hulett, A. E. Foss, G. Stewart, J. B. Hulett.

MID-ILLOVO FARMERS' CLUB.—Chairman: L. G. Wingfield-Stratford J.P. Vice-Chairman: B. B. Evans. Hon. Secretary: J. W. V. Montgomery. Assistant Hon. Secretary: S. C. Phipson. Hon. Treasurer: Jos. McCullough.

MOOI RIVER FARMERS' ASSOCIATION.—President: C. B. Lloyd; Vice-President:—R. Garland; Hon. Treasurer: H. A. Rohde; Collec.or: Capt. W. H. Stevenson; Auditor: Claude Scott; Hon. Secretary: E. Cauterley.

MUDEN AGRICULTURAL ASSOCIATION.—President: Thos. Thresh. Vice-Presidents: Wm. Lilje, E. A. Grantham. Secretary and Treasurer, C. A. Selling. Committee: Otto Rottcher, Karl Lilje, Karl Rotter, Herman Schafer, Fritz Torlage, T. Braithwaite, Ernest Rottcher, C. H. Tilbrook, Rev. H. Rottcher (Hon. Life Member).

NEWCASTLE.—President: F. A. R. Johnstone J.P. Vice-President: C. Earl, J.P., Mayor of Newcastle; Angus Wood, J.P., Ingogo; O. Schwikkard, C.M.G., Newcastle. Secretary: Wm. Beardall. Treasurer: Ed. Nicols. Executive Committee: L. H. S. Jones, E. Phillips, H. C. Caldecott, C. Watson, G. Langley, W. A. Lang, W. J. P. Adendorff, J. E. de Wet, O. Davis, S. W. Reynolds, B. Pettigrew, G. W. Thomas, G. H. Bishop, H. R. Muir, M. C. Adendorff, W. Napier, P. Van Breda, Chriss Botha, G. Templer.

NEW HANOVER AGRICULTURAL ASSOCIATION.—President: R. H. Oellermann. Vice-Presidents: J. C. Watt, J.P., and J. A. Westbrook. Life Member: C. A. S. Yonge, M.L.A. Secretary and Treasurer: W. D. Stewart, New Hanover. Auditor: J. H. F. Hohls. Committee: W. N. Angus, E. Bentley, W. W. Bentley, Edward Boast, H. W. Boast, E. E. Comins, G. R. Comins, C. Crookes, jun., G. Demont, H. Dinklemann, J. Duval, W. Fortmann, Dr. C. H. Herbert, J. Hillermann, J. H. F. Hohls, H. Jacobson, H. A. Light, G. C. Mackenzie, A. F. Mackenzie, T. M. Mackenzie, J. Muirhead, J.P., G. Moe, J. Moe, O. Moe, C. Oellermann, F. Oellermann, R. H. Oellermann, J. C. Otto, H. Oellermann, E. Peckham, J.P., J. A. Potterill, S. Peckham, C. M. Scott, Rev. J. Scott, Wm. Schroder, J.P., Owen Solomon, J. H. Smith, Riby Smith, H. Thöle, F. Thöle, H. Vorwerk, H. F. Westbrook, W. H. Westbrook, C. Westbrook, T. Wolhuter.

NOODSBERG ROAD AGRICULTURAL ASSOCIATION.—President: Fritz Reiche, J.P.; Vice-Presidents: H. Mummbrauer, P. Rodehorst, W. Dralle, W. Wortmann; Committee: W. Bartels, F. Boase, H. Brammer, A. J. Bruyns, H. Bruyns, Carl Dralle, H. Gebers, W. Gevers, J. H. Holley, jr., W. C. Holley, C. Hillermann, L. Koch, H. Köhler, F. E. Kuhn, M. Maister, H. Mereis, A. Meyer, H. Meyer-Estorf, H. W. Meyer, K. A. Meyer, H. Misselhorn, W. Misselhorn, K. Peters, I. Pfothenhauer, G. Rabe, G. Reiche, Joh. Reiche, W. Rencken, H. Rosenbrock, H. Schmidt, K. Schmidt, Rev. Jas. Scott, K. Seele, F. J. Smith, J. Thies, W. Witthöft, P. Wortmann, A. Wortmann, F. Wortmann, H. Wortmann; Secretary: Paul Vietzen, P.O., Singletree; Hon. Treasurer: E. Beurlen.

NOTTINGHAM ROAD FARMERS' ASSOCIATION.—President: W. Henwood, J.P., Vice-President: B. Greene; Auditor: A. Mengens; Secretary and Treasurer: C. J. King, Nottingham Road.

PIETERMARITZBURGSCH E BOEREN VEREENIGING.—President: D. P. Boshoff; Secretary: E. G. Jansen, 313, Loop Street, Maritzburg.

RICHMOND AGRICULTURAL SOCIETY.—President: John Marwick. Vice-Presidents: W. P. Payn, A. W. Cooper, J. W. McKenzie and Chas. Nicholson. Honorary Treasurer: R. Nicholson. Hon. Secretary: Tom Mc'Crystal. Committee: J. W. T. Marwick, Evan Harries, R. A. McKenzie, F. O. Howes, H. M. Moyes, W. Comrie, Thos. Marwick, J. C. Nicholson, J. W. Flett and E. J. B. Ho king.

ROYAL AGRICULTURAL SOCIETY OF NATAL.—President: Sir G. M. Sutton, K.O.M.G. Vice-Presidents: His Worship the Mayor, Messrs. Jas. King, O. Hosking, D. C. Dick, Col. E. M. Greene and P. D. Simmons. Executive: Sir G. M. Sutton, President; Messrs. Jas. King, O. Hosking, D. C. Dick, Col. E. M. Greene and P. D. Simmons, Vice-Presidents; Committee: G. J. Macfarlane, W. S.

Grant, W. H. Cobley, H. J. Stirton, W. J. O'Brien, L. Line and Sir T. K. Murray, Yard Superintendent: H. J. Stirton. Secretaries, Treasurers and Collectors: Duff, Eadie & Co., 12, Timber Street, Pietermaritzburg. Auditor: G. V. Lambert.

SLANG RIVER (UTRECHT) FARMERS' ASSOCIATION.—Chairman: P. J. Kemp; Executive Committee: J. J. Uys, J. Z. Moolman, T. J. Botha, P. J. Viljoen, P. J. Kemp; Hon. Sec. and Treasurer, Thys Uys, Utrecht P.O.

UMVOTI AGRICULTURAL SOCIETY.—President: Major T. Menne. Vice-Presidents: Theunis J. Nel, M.L.A., W. J. Slatter, W. L'Estrange. Executive Committee: Tol Nel, A. Newmarch, W. Lilje, O. Rottcher, S. C. Van Rooyen, W. Newmarch, E. J. Van Rooyen, O. Norton, I. M. Nel, J. Browning. Managers of Show Yard: J. M. Handley and N. Hunter. Hon. Auditor: W. K. Ente. Secretary and Treasurer: W. H. Gibbs.

UPPER BIGGARSBERG FARMERS' ASSOCIATION.—President: George Langley; Vice-President: W. L. Oldacre; Secretary: J. H. Murray.

UTRECHT AGRICULTURAL SOCIETY.—Chairman: L. Viljoen; Vice-Chairman: B. H. Breytenbach; Members: I. Bierman, M. M. Knight, J. H. Klopper, B. C. Hattingh, T. Botha, M. Gregory, P. L. Uys, H. P. Breytenbach; Secretary: G. J. Shawe.

UTRECHT BOEREN VEREENIGING.—President: D. J. A. van der Spuy; Secretary: G. J. Shawe, Utrecht.

VICTORIA COUNTY AGRICULTURAL SOCIETY.—President: Lieut.-Colonel F. Addison; Vice Presidents: Sir Liege Hulett, Kt., M.L.A., W. J. Thompson, Esq., J.P., J. Polkinghorne, Esq., M.L.A.; Committee: Messrs. W. H. B. Addison, G. S. Armstrong, M.L.A., C. Bishop, J.P., D. Brown, sen., J.P., W. Campbell, T. G. Colenbrander, A. E. Foss, J.P., A. S. L. Hulett, J.P., J. B. Hulett, C. Jackson, G. Nicholson, J.P., T. Polkinghorne, J. W. Perkins, J.P., E. Saunders, J.P., G. Stewart, and J. H. Stansell; Hon. Secretary and Treasurer: H. Curtis Smith (Stanger).

WEENEN AGRICULTURAL SOCIETY.—President: A. F. Henderson, Esq., C.M.G.; Vice-Presidents: J. Button, J.P., Jas. Ralfe, J.P., H. Blaker, J.P., E. B. Griffin, J.P.; Hon. Treasurer: F. O. Schiever; Auditor: S. Wolff; Executive, Hon. H. D. Winter, R. H. Ralfe, J. W. Moor, D. W. Mackay and Allan Stuart; Manager of Show Yard: S. Vaughan; Assistant: A. Clouston; Hon. Secretary: E. Cautherley.

WEENEN COUNTY HORTICULTURAL SOCIETY.—Committee of Management: A. F. Henderson, C.M.G., F. O. Schiever, G. W. Linfoot, P. J. Nunn, Dr. Brewitt, S. Vaughan; Hon. Secretary: E. Cautherley.

ZULULAND FARMERS' ASSOCIATION.—President: F. W. White; Vice-President: C. E. Symonds. Committee: J. J. van Rooyen, A. W. Symonds, H. T. James, R. J. Ort epp, J. P. Kokemoer.

ZULULAND COAST FARMERS' ASSOCIATION.—President: G. H. Hulett; Vice-President: C. Hill; Hon. Secretary and Treasurer: F. Brammage, Ginginhlovu.

(The Editor will be obliged if the Hon. Secretaries will supply him with lists of the Executives of their Associations.)

Brands Allotted to Infected Magisterial Divisions.

The following is a list of the brands which have been allotted to the several infected Magisterial Divisions: Durban County, D. 2; Alexanders County, A. 2; Lower Tugela, T. 2; Mapumulo, S. 2; Inanda, B. 2; Umsinga, U. 2; Dundee, X. 2; Vryheid, V. 2; Ngotshe, H. 2; Paulpietersburg, P. 2; Nongoma, G. 2; Mahlabatini, L. 2; Ndwedwe, N. 2; Weenen County, W. 2; Umvoti, F. 2; Hlabisa, K. 2; Eshowe, E. 2; Ladysmith R. 2; Babanango, O. 2.

Central Experiment Farm, Cedara.

IN order to minimise interference with the general course of work on the Central Experiment Farm, Cedara, it has been found necessary to set apart one day of the week, namely, Friday, as a visitors' day.

Arrangements will accordingly be made on that day for receiving visitors and showing them round the Farm. A trap will be at Cedara Station to meet the up 9.50 a.m. train: and if intending visitors from up-country will give notice to the guard at Howick Station, on their way down, a trap will be sent to meet the train which passes through Cedara at 11.2 a.m. Visitors travelling by other trains will also be met if they will previously make arrangements by writing.

On other than the visitors' day, visitors may be received by appointment, but special attention cannot be guaranteed in regard to their being shown round.

At least clear fourteen days' notice must be given by Associations, so that there may be time to make all necessary arrangements.

9th April, 1907

W. A. DEANE,
Minister of Agriculture.

Bulletins Issued by the Department of Agriculture.

Single copies may be obtained free (excepting those with price attached) on application to the Secretary, Minister of Agriculture.

No.

- 1.—"Notes on Fruit Culture," by Claude Fuller. [1902]. (*Out of print*).
- 2.—"Manures on the Natal Market, 1902," by A. Pardy. [1902].
- 3.—"Insects in an Important Rôle," by Claude Fuller. [1904]. (*Out of Print*).
- 4.—"Manures on the Natal Market, 1903," by A. Pardy. [1903].
- 5.—"Weed Circular," by Claude Fuller. [1905].
- 6.—"Manures on the Natal Market, 1904," by A. Pardy. [1904].
- 7.—"Tree-planting in Natal," by T. R. Sim. [1905]. (*Price 2s. 6d.*)
- 8.—"Agricultural Co-operation," by E. T. Mullens. [1905]. (*Out of Print*)
- 9.—"Potato Culture," by A. N. Pearson. [1905].
- 10.—"Manures on Natal Market, 1905," by A. Pardy. [1905].
"Agricultural Statistics, Natal, 1904-5." [1906].
- 11.—"East Coast Fever," by S. B. Woollatt. [1906].
- 12.—"Manures on Natal Market, 1906," by A. Pardy. [1906].

Employment Bureau.

THE Department of Agriculture has received applications from the undermentioned, who are prepared to become assistants or apprentices on farms. The Department will be glad to hear from farmers willing to take young men as assistants, and to place them in correspondence with the various applicants. When communicating on the subject, farmers may refer to the applicants by quoting the numbers in the following list:—

No. 92a.—Englishman, 50 years of age, with varied experience in tea and coffee planting in Ceylon, and also of contract work. Has also been on a Sugar Estate, and has had experience in pig rearing. Salary needed.

No. 94.—Cottchiman, who has lived all his life in South Africa, desires employment on farm in connection with stock if possible. Was a Head Conductor during Boer War. Was 2 years with Transvaal P.W.D. as handyman. Produces good references. Desires salary.

No. 95.—German, of respectable appearance, who speaks English fluently, desires employment on a farm. Is 48 years of age, and has been accustomed to farm work, wire fencing, masonry, carpentry, &c. Salary required.

No. 97a.—Colonial, aged 22, bricklayer by trade, speaks Zulu, Dutch, and Hindustani, desires employment as a farm hand. Was on a farm in vicinity of Pretoria for six months.

No. 98.—Englishman, 25 years, desires situation on sheep and stock farm. Had experience of sheep on father's farm in Lincolnshire. Has been four years in Natal.

No. 99.—Englishman, 17, Colonial born, anxious to learn farming. No previous experience.

No. 100.—Englishman, 23, with experience gained in Richmond district, desires to get on to farm further up country. States he is active and not afraid of work. Wage no particular object.

No. 101.—Applicant, 45 years of age, at present a factory manager in Mauritius, desires employment in Natal. Has had 25 years' experience in the cultivation of sugar cane and vanilla. Produces good testimonials. Services are likely to be available shortly owing to failure of the cane crop. Is married, with family.

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